The Distribution of Landings of British Columbia Salmon in Relation to Size of the Commercial Fishing Fleet, 1967 - 1981. I. Pink Salmon.

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May 1984

Canadian Technical Report of
Fisheries and Aquatic Sciences
No. 1277

84-4184/

Canadian Technical Report of Hydrography and Ocean Sciences

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Cat. No. Fs 97-6/1277E ISSN 0706-6457

Correct citation for this publication:

Beacham, T. D. 1984. The distribution of landings of British Columbia salmon in relation to the size of the commercial fishing fleet, 1967-1981. I. Pink salmon. Can. Tech. Rep. Fish. Aquat. Sci. 1277: 79 p.

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ABSTRACT

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The distribution of landings of pink salmon in relation to the size of the commercial fishing fleet was investigated on an annual basis during 1967-1981. An average of 1320 gillnetters accounted for 90% of the total landings in any year. Eighty percent of the vessels participating in the gillnet fishery landed less than 1000 pink salmon annually. The top 50% of the vessels participating in the gillnet fishery accounted for 90% of the total annual landings. An average of 305 purse seiners accounted for 90% of the landings in any year, and 50% of the seiners landed less than 10,000 pieces annually. The top 50% of the seiners accounted for 80% of the total annual landings. An average of 900 trollers accounted for 90% of the total annual landings. When troll landings exceeded 4 million pieces annually, approximately 1200 trollers accounted for 90% of the total landings. An average of 450 trollers landed more than 1000 pieces annually. The top 50% of the vessels that landed troll-caught pink salmon accounted for 95% of the total annual landings. For all gear types, fishermen that were successful in catching pink salmon were also successful in catching other salmon species.

Key words: British Columbia, catch, exploitation, gillnet, pink salmon, seine, troll.

RÉSUMÉ

Beacham, T. D. 1984. The distribution of landings of British Columbia salmon in relation to the size of the commercial fishing fleet, 1967-1981. I. Pink salmon. Can. Tech. Rep. Fish. Aquat. Sci. 1277: 79 p.

On a étudié la distribution annuelle des débarquements de saumon rose de 1967 à 1981, en fonction de la taille de la flottille de pêche commerciale. Chaque année, 90 % des débarquements étaient effectués, en moyenne, par 1,320 bateaux de pêche aux filets maillants. De ces bateaux, 80 % ont débarqué moins de 1,000 saumons roses annuellement et les premiers 50 % ce sont appropriés 90 % des prises totales annuelles. Une moyenne de 305 senneurs, dont 50 % ont débarqué moins de 10,000 poissons annuellement, ont capturé 90 % des prises annuelles. Les premiers 50 % de ces senneurs ont pêché 80 % des prises totales annuelles. Une moyenne de 900 bateaux de pêche à la traîne ont capturé 90 % des débarquements totaux annuels de saumon rose. Quand les prises à la traîne dépassaient 4 millions de poissons annuellement, 90 % des débarquements totaux étaient le fait d'environ 1,200 bateaux. Une moyenne de 450 bateaux de pêche à la traîne ont débarqué plus de 1,000 saumons roses par année. Des débarquements totaux annuels de saumons roses capturés à la traîne, 95 % avaient été pris par les premiers 50 % des bateaux. Pour ce qui est de tous les types d'engins, les pêcheurs obtenant de bons résultats avec le saumon rose avaient aussi du succès avec d'autres espèces de saumon.

Mots-clés: Colombie-Britannique, prise, exploitation, filet maillant, saumon rose, senne, pêche à la traîne.

INTRODUCTION

It is recognized that the British Columbia commercial fishing fleet for salmon is currently too large, given the amount of salmon to be harvested and the efficiency of the fleet to do so. The commission on Pacific fisheries policy suggested that the salmon fleet be reduced to half of its present capacity over a 10-year period (Pearse 1982). This reduction in fleet size was suggested to be accomplished by a buy-back program. In an evaluation of a buy-back program, a committee was established to recommend in part the number of vessels that should be present in the fishery after the buy-back program is completed. The recommendation for the salmon fleet was for 400 seiners, 1467 trollers, and 2208 gillnet plus gillnet/troll combination vessels (Cruikshank et al. 1982). The fleet would then be reduced by 132 seiners (from 532 to 400), 200 trollers (from 1667 to 1467), and 300 gillnet plus gillnet/troll combination vessels (from 2508 to 2208) (Cruikshank et al. 1982). However, it is uncertain what the degree of redistribution of the catch would be if the suggested number of vessels were removed from the fleet.

Incomes are distributed non-uniformly among fishermen (Sinclair 1978). Landings of salmon may also distributed non-uniformly among different vessels participating in the salmon fishery. The present report details the distribution of landings of pink salmon (Oncorhynchus gorbuscha) in relation to the size of the commercial fishing fleet and indicates the degree of redistribution of the landings that may be expected when decisions on fleet size are made.

An analysis was conducted in order to determine the distribution of catch in relation to the number of commercial fishing vessels for each species of Pacific salmon and for all species combined on a weight basis. This analysis was conducted for each of the major gear components in the British Columbia salmon fishery (gillnet, seine, and troll). When the distribution of catch of Pacific salmon in relation to the size of the commercial fleet is known, decisions can be made on the level to which the fleet could be reduced. The present report deals with the distribution of landings of pink salmon during 1967-1981 in relation to the number of commercial fishing vessels in British Columbia and it is the first in a series of reports on the distribution of landings of Pacific salmon.

MATERIALS AND METHODS

The information upon which the distribution of landings in relation to the size of the commercial fishing fleet is determined is derived from sales-slips. Wong (1983) has described the procedure used in recording and editing the information contained on the sales-slip. Summarized briefly, sales-slips are generated when the catch is delivered for processing or sold, and information on the commercial fishing vessel (CFV) license number, gear, area, period, and weight or numbers of species caught is recorded.

Sales-slips lacking numbers of salmon landed but containing the weight landed are adjusted for numbers by dividing the weight by the mean weight of the particular species, area, and gear that are applicable.

The analysis in the present study depended upon compiling the annual landings by species for each commercial fishing vessel in the three major gear classifications: purse seiner, gillnetter, and troller. This should be confidential information, so that, as outlined by Wong (1983), original commercial fishing vessel license numbers are converted to different codes by a standard method each year, so that it is not possible to relate catches to a specific vessel without authorization. The analysis for this report used solely the transformed license numbers.

The analysis of the sales-slips revealed that in some instances, there would be only 1 sales-slip for a particular license number in one of the three gear classes in a year. These were assumed to be errors in recording the license number, and were deleted in the subsequent description of the distribution of the catch. The distribution of catch was summarized in two ways, the first being by the number of vessels in a particular gear class, and the second by the percentage of vessels in a particular gear class. The number of vessels that landed salmon in a particular gear class was not constant during 1967-1981, so that both methods were used to describe the catch distribution.

Landings from combination vessels (gillnet and troll gear) were assigned to the gear used to catch the salmon sold at the time that the sales-slip was generated. Landings from a combination vessel would thus appear in both the troll and gillnet gear classes as appropriate.

The salmon sales-slip data tapes upon which the present analysis is based were derived from Wong (1983). The number of purse seiners found to be landing pink salmon in 1980 and 1981 was greater than the number of licensed vessels. It was assumed that errors were made in recording the gear of some commercial fishing vessel license numbers so that the maximum number of purse seiners in 1980 and 1981 was set at the number of licenses (532). For the analysis in this report, landings of pink salmon by purse seine vessels were arranged in descending order and landings from the 533rd vessel onwards were deleted. This removed those vessels with the smallest annual landings of pink salmon.

The top 200 vessels in terms of landings for a particular species were recorded annually for trollers and gillnetters during 1967-1981. The top 100 seiners were recorded annually during 1969-1981. When the top vessels were identified in a particular year, it was possible to examine how many were also in the top category in previous and subsequent years. For example, once the top 200 trollers for pink salmon had been identified in 1975, it was possible to examine how many of these same vessels were in the top 200 trollers for pink salmon in 1973 or 1981. This analysis was conducted in order to determine whether or not some fishermen were successful on a continuing basis.

Comparisons among landings of each species by gear type were examined on an annual basis during 1967-1981 for the top 200 gillnetters and trollers and top 100 seiners. For example, the top 100 seiners for pink

salmon landings in 1975 were compared with the top 100 seiners for sockeye landings in 1975. This analysis evaluates whether or not some fishermen are consistently successful for all species or if there are specific associations among the species.

The analysis of distribution of landings in relation to the number of vessels in each fleet component first proceeded by determining annual landings for each species for each vessel in the three gear categories. Vessels were then sorted in descending order based upon the size of the landings for each species. Once the total catch and the total number of vessels that participated in the fishery for each species were determined, it was then possible to calculate the proportion of the catch that was taken by different numbers of vessels and also different proportions of the fleet. The number and percentage of vessels that landed different numbers of salmon were also calculated.

RESULTS

GILLNET COMPONENT

The landings of pink salmon by gillnetters have ranged from 1.0 to 4.2 million pieces annually during 1967 to 1981 (Table 1). Annual landings ranged between 1.0 and 2.4 million pieces, except for 4.2 million pieces landed in 1970. The gillnet share of the total landings of pink salmon has been less than 20% since 1977.

The distribution of total landings of pink salmon in relation to the number of vessels participating in the gillnet fishery was examined on an annual basis during 1967-1981 (Appendix A, Tables A1-A15). This 15-year distribution of the landings in relation to the number of vessels in the fishery is summarized in Figure 1. An average of about 1320 vessels accounted for 90% of the total landings in any year. The landing of 4.2 million pieces in 1970 required no more vessels to land 90% of the total than the 1.0 million pieces in 1975. The top 960 vessels accounted for an average of 80% of the total landings in any year (Table 2). When the landings increased by 10% when increasing from 80 to 90% of the total landings, the number of vessels increased by 38%. In order to account for 100% of the landings as compared with 90%, the number of vessels increased 100% from 1320 to 2620 vessels.

The frequency of total landings per vessel was also investigated on an annual basis. An average of 80% of the vessels participating in the gillnet fishery for pink salmon landed less than 1000 pink salmon annually during 1967-1981 (Table 3). About 7% of the vessels landed more than 2000 pink salmon annually. The poorest 50% of the vessels participating in the fishery land less than 500 pink salmon each in most years. The top 50% of the vessels participating in the gillnet fishery during 1967-1981 accounted for,

on average, 90% of the total annual landings (Table 4). As noted previously, this 90% share of the total gillnet landings of pink salmon was accounted for by about 1320 vessels.

The repeatability of success in landing pink salmon was examined by identifying the top 200 gillnetters in each year during 1967-1981 and tallying how many of these 200 were in the top 200 in all other years. The results are illustrated in Table 5. With an average of 2637 vessels in the fishery and under the assumption of a random distribution of the top 200 vessels in all years except the one in which they were the top 200 vessels, one would expect an average of (200/2637) x 200 = 15 vessels to appear by chance. If 23 or more appear, there is a significant statistical association ($x^2 = 3.84$, $P < 0.05$), which indicates that vessels successful in one year were also successful in previous and successive years. For example, if one examines the top 200 vessels in 1978, there were a significant number of these vessels that were also in the top 200 vessels during 1970-1981 (Table 5). This analysis indicates that successful pink salmon gillnet vessels tend to be successful on a continuing basis.

The previous analysis indicated that pink salmon gillnet vessels tend to be successful on a continuing basis. Also investigated was whether or not they were also successful for other species of salmon. This analysis was conducted by identifying the top 200 gillnet vessels for each of the five species of Pacific salmon for each year during 1967-1981. If 23 or more vessels appear in any combination of the species, there were significant associations in terms of fishermen's success between the species ($x^2 = 3.84$, $P < 0.05$). Gillnet vessels that were successful for pink salmon were, on average, also successful for chum, coho, and sockeye salmon, but not for chinook salmon (Table 6). Successful chinook salmon gillnet vessels were successful for sockeye, but only moderately successful for coho ($P < 0.10$). Of the 10 possible species combinations, 6 were statistically significant, which indicates that successful gillnet vessels are successful in more than one salmon species.

SEINE COMPONENT

The landings of pink salmon by purse seiners have been variable during 1967-1981, ranging from 0.9 million pieces in 1969 to 16.2 million pieces in 1968 (Table 1). Purse seiners usually accounted for about 65% of the annual landings during 1967-1981.

The distribution of total landings of pink salmon in relation to the number of purse seiners was examined on an annual basis during 1967-1981 (Appendix B, Tables B1-B15). The distribution of the landings in relation to the number of purse seiners participating in the fishery is summarized in Figure 2. On an average basis between 1967 and 1981, about 305 purse seiners accounted for 90% of the total landings in any year. In 1969, when 0.9 million pieces were landed, 241 vessels accounted for 90% of the total landings, and in 1968, when 16.2 million pieces of pink salmon were landed by purse seiners, 257 vessels accounted for 90% of the total (Table 7). An average of 240 vessels accounted for 80% of the total landings in any year.

In moving from 80 to 90% of the total landings of pink salmon, the number of vessels increased from 240 to 305. This 10% increase in catch was accounted for by a 27% increase in the number of vessels. In examining the number of vessels that account for 100% of the landings, the number was, on average, 487, an increase of 59% over the number of vessels accounting for 90% of the landings.

The frequency of total landings per vessel was also investigated on an annual basis. About 50% of the purse seiners participating in the pink salmon fishery landed less than 10,000 pieces annually (Table 8). An average of about 4% of the vessels landed in excess of 50,000 pieces annually. The top 50% of the vessels participating in the fishery during 1969-1981 accounted for, on average, 80% of the total annual landings (Table 4). This 80% of the total purse seine landings of pink salmon was previously noted to be accounted for by the top 240 purse seiners.

The annual repeatability of success in landing pink salmon in the purse seine fishery was examined by identifying the top 100 seiners in each year during 1969-1981 and tallying how many of these 100 were in the top 100 in all other years (Table 9). Using an average of 486 vessels in the fishery, one would expect, under the assumption of a random distribution of the top 100 vessels in all years except the one in which they were the top 100 vessels, that an average of (100/487) x 100 = 21 vessels to appear by chance. If 30 or more vessels appear, this indicates that vessels successful in one year (the diagonal of 100s in Table 9) were also successful in the year for which 30 or more vessels are counted ($x^2 = 3.84$, $P < 0.05$). For example, the top 100 seiners for pink salmon in 1977 were also more successful for pink salmon in 1975, 1976, 1978, and 1980 than one would expect by chance (Table 9). There is some evidence to indicate that successful pink salmon purse seine vessels tend to be successful on a short-term basis.

As with the gillnet component of the commercial fishing fleet, the relative success of the top 100 purse seiners for pink salmon was investigated in relation to the other species of salmon landed. The top 100 purse seine vessels for each of the five species of Pacific salmon were identified for each year during 1967-1981. If 30 or more vessels were present in any combination of two species, then there was a significant association in terms of fishermen's success between the species ($x^2 = 3.84$, $P < 0.05$). Purse seine vessels that were successful for sockeye salmon were also successful for coho salmon (Table 10). The top 100 purse seine vessels that landed chinook salmon also tended to be in the top 100 class for the other salmon species.

TROLL COMPONENT

The landings of pink salmon by the troll component of the commercial fleet has usually ranged between 20 to 35% of the total landings during 1967-1981. Landings were higher in odd years than in even years, owing to the absence of Fraser River pink salmon in even years. Landings were in excess of 4.4 million pieces in 1981 (Table 1).

The distribution of total landings of pink salmon in relation to the number of vessels that used troll gear to land pink salmon was examined on an annual basis during 1967-1981 (Appendix C, Tables C1-C15). The distribution of landings of pink salmon in relation to the number of vessels using troll gear that participated in the fishery is summarized in Fig. 3. On an average basis between 1967 and 1981, about 900 trollers accounted for 90% of the landings in any year (Table 11). However, when the landings exceeded 4 million pieces in 1979 and 1981, there were 1226 and 1197 vessels, respectively, that accounted for 90% of the total landings (Fig. 3). On an average basis between 1967 and 1981, the top 623 vessels accounted for 80% of the landings in any year. However, in 1979 and 1981, these figures were 918 and 888 vessels, respectively. In increasing from 80 to 90% of the total troll-caught landings of pink salmon, the average number of vessels that accounted for the catch increased from 623 to 896, an increase of 44%. An average of 2360 vessels accounted for 100% of troll-caught pink salmon, an increase of 163% over the number of vessels accounting for 90% of the landings.

The frequency of total landings per vessel was also investigated on an annual basis during 1967-1981. An average of 450 vessels landed more than 1000 pink salmon annually (Table 12). Of the vessels that used troll gear to land pink salmon, 81% of these vessels landed less than 1000 troll-caught pink salmon annually. The top 50% of the vessels that landed troll-caught pink salmon during 1967-1981 accounted for, on average, 95% of the total annual landings (Table 4).

The annual repeatability of success in landing pink salmon in the troll fishery was examined by identifying the top 200 vessels in each year during 1967-1981, and tallying how many of these 200 were in the top 200 in all other years (Table 13). Using an average of 2360 vessels in the fishery, one would expect, under the assumption of a random distribution of the top 200 vessels in all years except the one in which they were the top 200 vessels, that an average of (200 x 200/2360) = 17 vessels to appear by chance. If 25 or more vessels appear, this indicates that the vessels successful in one year (the diagonal of 200s in Table 13) were also successful in the year in which 25 or more vessels were counted ($x^2 = 3.84$, $P < 0.05$). For example, the top 200 trollers in 1977 were also more successful for pink salmon during 1973 to 1981 than one would expect by chance alone (Table 13). This analysis suggests that successful troll fishermen tend to be successful for pink salmon on a continuing basis.

The relative success of the top 200 trollers for pink salmon was also investigated in relation to the other species of salmon landed. The top 200 trollers for each of the five species of Pacific salmon were identified for each year during 1967-1981. If 25 or more vessels were present in any combination of two species, then there was a significant association in terms of fishermen's success between the species ($x^2 = 3.84$, $P < 0.05$). Troll vessels that were successful for one species were usually successful for all species (Table 14). The association was strongest between chinook and coho salmon, which indicates that troll vessels that did well in terms of coho salmon landings also did well in terms of chinook salmon. In odd years, there

were highly significant associations between sockeye and pink salmon, indicative of the presence of Fraser River pink salmon in odd years. Troll vessels that were successful for pink salmon also tended to be successful for chum salmon.

DISCUSSION

The number of vessels accounting for 90% of the harvest of British Columbia pink salmon under a similar management policy as was instituted during 1967-1981 was found to be about 1300 gillnet vessels, 300 purse seine vessels, and 1200 trollers if troll-caught pink salmon landings exceed 4 million pieces annually. Reducing the size of the commercial fleet to these levels would not significantly reduce the overall landings of pink salmon nor the exploitation rates on the species. With less competition among vessels of each gear class under a reduced fleet size, the exploitation rate of an average vessel could increase to the extent that overall exploitation rates on pink salmon stocks could increase. Exploitation rates must necessarily continue to be regulated by restrictions on fishing time and locations.

The number of vessels of each gear class that the present analysis indicates would be sufficient to harvest British Columbia pink salmon is less than the recommendations of a British Columbia fleet rationalization committee of 2208 gillnetters, 400 seiners, and 1467 trollers (Cruikshank et al. 1982). The present analysis suggests that the number of seiners could be reduced by 44% (from 532 to 300), trollers by 28% (from 1667 to 1200), and gillnetters and combination gillnet/troll vessels by 48% (from 2508 to 1300) and the landings of pink salmon would not be significantly reduced. It is assumed that the least effective vessels would be removed from the fishery. The present analysis deals only with pink salmon landings, but the results for the other species are similar (unpublished data).

Reduction of fleet size to the levels suggested by the fleet rationalization committee (Cruickshank et al. 1982) were projected to result in rapid rises in income to the vessels remaining in the commercial fleet. The present analysis for pink salmon suggests that if the least efficient vessels are removed from the fleet, mean landings of pink salmon per vessel will not increase and thus mean gross income per vessel remaining in the fleet will not increase, as long as total catches do not increase.

The present report outlines the number of vessels necessary to harvest British Columbia pink salmon if current management practices are continued and current gear distributions of catch are maintained. It does not consider the social implications of reduction of fleet size and these should be considered in the establishment of targets for a reduced size of the commercial salmon fleet in British Columbia.

ACKNOWLEDGMENTS

Mr. Fred Wong made available the data upon which the distribution of landings of salmon in relation to fleet size was determined. Mr. Bruce Bernard designed the computer software for the graphics in this report. Mr. Bernard's assistance in this project was invaluable, and the study could not have been conducted in its present form without his considerable talents. Mr. M. Farwell and Mr. A. Gould made many helpful suggestions for improvement of the manuscript.

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Table 1. Commercial landings (pieces) of pink salmon in British Columbia, 1967-1981.

Year	Gillnet	Seine	Troll	Total
1967	2023360	5406300	2229020	9658680
1968	2398370	16201400	1565510	20165280
1969	997190	888970	683050	2569210
1970	4246360	8058550	1212070	13516980
1971	2133780	5037830	1284370	8455980
1972	1657710	11518800	1033300	14209810
1973	1289610	3999930	1231790	6521330
1974	1525150	5239070	609720	7373940
1975	1035760	2790020	807820	4633600
1976	1610290	7933120	805440	10348850
1977	2278110	5405830	2672420	10356360
1978	1382890	8939000	426110	10748000
1979	1017610	6770440	4034460	11822510
1980	1257740	7143870	1421360	9822970
1981	2160130	11485720	4439930	18085780

Table 2. Number of gillnetters accounting for varying percentages of the total gillnet landings of pink salmon, 1967-1981.

Percent of total landings	Year															
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1967-1981
10	59	34	62	76	59	30	49	13	22	21	36	19	40	18	50	39
20	151	90	148	176	143	82	123	31	57	65	97	47	94	45	121	98
30	266	167	256	294	248	158	223	53	110	124	173	91	158	81	210	174
40	405	269	385	430	371	252	343	86	187	200	261	149	237	130	317	268
50	568	392	536	584	519	366	485	146	303	297	365	223	336	193	444	384
60	759	543	719	759	702	506	659	261	462	419	492	315	459	279	591	528
70	994	730	945	963	931	679	873	445	674	576	653	441	617	402	769	713
80	1,291	978	1,240	1,207	1,225	907	1,154	710	967	797	880	623	816	575	993	957
90	1,707	1,329	1,685	1,532	1,646	1,228	1,561	1,103	1,406	1,142	1,263	921	1,099	836	1,300	1,317
100	3,178	2,745	3,311	2,909	3,452	2,620	2,837	2,283	2,818	2,193	2,686	2,058	2,190	1,964	2,303	2,637

Table 3. Frequency (and percentage) of vessels landing pink salmon in British Columbia using gillnets, 1967-1981.

Catch interval (pieces)	Year 1967	1968	1969	1970	1971	1972	1973	1974
1-500	1889 (59.4)	1457 (53.1)	2608 (78.8)	1015 (34.9)	2006 (58.1)	1550 (59.2)	1962 (69.2)	1611 (70.6)
501 -1000	753 (23.7)	570 (20.8)	548 (16.6)	349 (12.0)	720 (20.9)	527 (20.1)	582 (20.5)	412 (18.4)
1001-1500	341 (10.7)	312 (11.4)	123 (3.7)	354 (12.2)	322 (9.3)	268 (10.2)	186 (6.6)	84 (3.7)
1501-2000	115 (3.6)	181 (6.6)	23 (0.7)	348 (12.0)	205 (5.9)	142 (5.4)	62 (2.2)	42 (2.8)
2001-2500	48 (1.5)	80 (2.9)	9 (0.3)	277 (9.5)	107 (3.1)	53 (2.0)	28 (1.0)	17 (0.7)
2501-3000	15 (0.5)	42 (1.5)	0 (0.0)	221 (7.6)	44 (1.3)	24 (0.9)	9 (0.3)	23 (1.0)
3000 +	17 (0.5)	103 (3.8)	0 (0.0)	345 (11.9)	48 (1.4)	56 (2.1)	8 (0.3)	94 (4.1)
Total	3178	2745	3311	2909	3452	2620	2837	2283

Catch interval (pieces)	Year 1975	1976	1977	1978	1979	1980	1981	1967-1981
1-500	2283 (81.0)	1279 (58.3)	1524 (56.7)	1336 (64.9)	1474 (67.3)	1420 (72.3)	927 (40.3)	1623 (61.5)
501 -1000	330 (11.7)	406 (18.5)	407 (15.2)	307 (14.9)	432 (19.7)	275 (14.0)	539 (23.4)	477 (18.1)
1001-1500	75 (2.7)	223 (10.2)	221 (8.2)	151 (7.3)	150 (6.8)	104 (5.3)	357 (15.5)	218 (8.3)
1501-2000	54 (1.9)	108 (4.9)	178 (6.6)	100 (4.9)	89 (4.1)	62 (3.2)	219 (9.5)	129 (4.9)
2001-2500	29 (1.0)	63 (2.9)	136 (5.1)	65 (3.2)	33 (1.5)	32 (1.6)	116 (5.0)	73 (2.8)
2501-3000	12 (0.4)	44 (2.0)	96 (3.6)	21 (1.0)	7 (0.3)	24 (1.2)	64 (2.8)	43 (1.6)
3000 +	35 (1.2)	70 (3.2)	124 (4.6)	78 (3.8)	5 (0.2)	47 (2.4)	81 (3.5)	74 (2.8)
Total	2818	2193	2686	2058	2190	1964	2303	2637

Table 4. Percentage of total landings of pink salmon by gear that the top 50% of the vessels in gear type account for.

Year	Gillnet	Seine	Troll
1967	87	85	94
1968	91	84	96
1969	90	84	95
1970	88	89	94
1971	92	85	94
1972	92	90	96
1973	86	72	93
1974	91	80	96
1975	90	80	95
1976	89	80	96
1977	92	73	93
1978	93	85	96
1979	90	72	93
1980	93	80	97
1981	85	68	92
Mean	90	80	95

Table 5. A measure of the repeatability of success of catching pink salmon by gillnetters. The top 200 gillnetters in terms of pink salmon landings were identified each year (diagonal in table). The number of times that those 200 vessels were in the top 200 in previous and subsequent years is recorded by column. For example, of the top 200 gillnetters in 1973, 77 were in the top 200 in 1971 and 50 in the top 200 in 1979. Twenty-three or more vessels in each year is indicative of a significant statistical association.

	Year														
Year	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1967	200	10	16	15	18	8	14	5	8	5	12	7	5	5	8
1968	10	200	8	31	6	37	12	42	13	27	8	23	6	15	14
1969	16	8	200	43	76	32	58	3	25	10	36	22	31	18	16
1970	15	31	43	200	48	40	35	16	18	22	35	24	28	21	14
1971	18	6	76	48	200	48	77	9	29	15	49	27	38	14	16
1972	8	37	32	40	48	200	44	56	18	48	26	37	28	35	28
1973	14	12	58	35	77	44	200	12	27	20	56	26	50	19	22
1974	5	42	2	16	9	56	12	200	15	77	18	64	12	44	28
1975	8	13	25	18	29	18	27	15	200	27	51	17	24	20	18
1976	5	27	10	2	15	48	20	77	27	200	35	64	27	50	40
1977	12	8	36	35	49	26	56	18	51	35	200	41	72	34	40
1978	7	23	22	24	27	37	26	64	17	64	41	200	39	65	56
1979	5	6	31	28	38	28	50	12	24	27	72	39	200	41	57
1980	5	15	18	21	14	35	19	44	20	50	34	65	41	200	67
1981	8	14	16	14	16	28	22	28	18	40	40	56	57	67	200

Table 6. A measure of the repeatability of success of catching salmon by gillnetters. The top 200 gillnetters for each species in each year were identified (diagonal in tables). The number of times that the top 200 gillnetters for one species (e.g. 1967 pink salmon) were in the top 200 gillnetters for another species (e.g. 89 were also in the top 200 coho landings) is listed. Twenty-three or more vessels in each class is indicative of a significant statistical association.

	Chinook	Sockeye	Coho	Pink	Chum
			1967		
Chinook	200	31	13	23	19
Sockeye		200	31	55	27
Coho			200	89	26
Pink				200	27
Chum					200
			1968		
Chinook	200	21	7	15	9
Sockeye		200	61	18	23
Coho			200	22	34
Pink				200	25
Chum					200
			1969		
Chinook	200	35	26	17	9
Sockeye		200	84	20	15
Coho			200	10	27
Pink				200	13
Chum					200
			1970		
Chinook	200	39	28	0	1
Sockeye		200	50	24	15
Coho			200	23	30
Pink				200	43
Chum					200
			1971		
Chinook	200	35	16	12	1
Sockeye		200	52	28	11
Coho			200	11	17
Pink				200	20
Chum					200

Table 6 (cont'd)

	Chinook	Sockeye	Coho	Pink	Chum
			1972		
Chinook	200	36	9	8	9
Sockeye	36	200	29	33	31
Coho			200	29	82
Pink				200	13
Chum					200
			1973		
Chinook	200	35	16	8	4
Sockeye		200	42	61	26
Coho			200	23	32
Pink				200	23
Chum					200
			1974		
Chinook	200	22	18	32	10
Sockeye		200	51	11	20
Coho			200	11	33
Pink				200	21
Chum					200
			1975		
Chinook	200	39	13	16	10
Sockeye		200	70	69	37
Coho			200	22	61
Pink				200	31
Chum					200
			1976		
Chinook	200	64	13	18	14
Sockeye		200	63	13	16
Coho			200	26	31
Pink				200	37
Chum					200
			1977		
Chinook	200	43	32	5	7
Sockeye		200	37	54	19
Coho			200	15	23
Pink				200	67
Chum					200

Table 6 (cont'd)

	Chinook	Sockeye	Coho	Pink	Chum
			1978		
Chinook	200	29	6	20	4
Sockeye		200	30	8	15
Coho			200	51	55
Pink				200	13
Chum					200
			1979		
Chinook	200	43	37	7	16
Sockeye		200	25	88	7
Coho			200	43	38
Pink				200	9
Chum					200
			1980		
Chinook	200	90	40	8	8
Sockeye		200	49	13	20
Coho			200	39	52
Pink				200	19
Chum					200
			1981		
Chinook	200	56	52	17	10
Sockeye		200	52	55	12
Coho			200	47	29
Pink				200	34
Chum					200
			1967-1981		
Chinook	200	41	22	14	9
Sockeye		200	45	37	19
Coho			200	31	38
Pink				200	26
Chum					200

Table 7. Number of seiners accounting for varying percentages of the total purse seine landings of pink salmon, 1967-1981.

Percent of total landings	Year															
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1967-1981
10	15	16	14	14	16	13	18	14	9	15	16	12	22	17	25	16
20	34	35	29	33	35	30	42	32	23	34	36	26	49	37	56	35
30	55	56	47	54	57	48	68	53	41	57	61	42	80	61	91	58
40	78	81	67	80	83	69	98	79	65	85	91	62	115	88	130	85
50	105	108	89	109	111	92	131	110	97	116	127	87	154	120	172	115
60	137	137	114	142	143	118	167	145	137	150	170	118	197	159	219	150
70	175	171	146	179	179	148	207	184	182	191	224	158	247	207	272	191
80	220	210	186	223	222	184	253	233	238	239	288	212	306	266	335	241
90	280	257	241	277	273	240	309	297	311	301	363	292	380	347	411	305
100	506	461	413	541	493	475	434	467	481	469	490	490	514	532	532	487

Table 8. Frequencies (and percentage) of vessels landing pink salmon in British Columbia by purse seine, 1967-1981.

Catch interval (pieces)	Year 1967	1968	1969	1970	1971	1972	1973	1974
1- 10,000	277 (54.7)	140 (30.4)	413 (100.0)	229 (42.3)	244 (49.5)	183 (38.5)	255 (58.8)	249 (53.3)
10,000- 20,000	140 (27.7)	36 (7.8)	-	133 (24.6)	182 (36.9)	78 (16.2)	168 (38.7)	152 (32.5)
20,001- 30,000	69 (13.6)	44 (9.5)	-	103 (19.0)	57 (11.6)	41 (8.6)	9 (2.1)	48 (10.3)
30,001- 40,000	18 (3.6)	72 (15.6)	-	40 (7.4)	8 (1.6)	52 (10.9)	2 (0.5)	13 (2.8)
40,001- 50,000	2 (0.4)	51 (11.1)	-	24 (4.4)	2 (0.4)	42 (8.8)	-	3 (0.6)
50,001- 60,000	-	53 (11.5)	-	6 (1.1)	-	32 (6.7)	-	2 (0.4)
60,001- 70,000	-	20 (4.3)	-	4 (0.7)	-	25 (5.3)	-	-
70,001- 80,000	-	27 (5.9)	-	2 (0.4)	-	15 (3.2)	-	-
80,001- 90,000	-	11 (2.4)	-	-	-	1 (0.2)	-	-
90,001-100,000	-	3 (0.7)	-	-	-	2 (0.4)	-	-
100,000 +	-	4 (0.9)	-	-	-	4 (0.8)	-	-
Total	506	461	413	541	493	475	434	462

Catch interval (pieces)	Year 1975	1976	1977	1978	1979	1980	1981	1967-1981
1- 10,000	416 (86.5)	155 (33.0)	296 (60.4)	218 (44.5)	194 (37.7)	287 (53.9)	61 (11.5)	241 (49.6)
10,001- 20,000	48 (10.0)	150 (32.0)	136 (27.8)	116 (23.7)	230 (44.7)	156 (29.3)	203 (38.2)	129 (26.5)
20,001- 30,000	13 (2.7)	100 (21.3)	44 (9.0)	60 (12.2)	79 (15.4)	64 (12.0)	169 (31.8)	60 (12.3)
30,001- 40,000	3 (0.6)	36 (7.7)	11 (2.2)	32 (6.5)	10 (1.9)	20 (3.8)	71 (13.3)	26 (5.3)
40,001- 50,000	1 (0.2)	21 (4.5)	3 (0.6)	21 (4.3)	1 (0.2)	5 (0.9)	22 (4.1)	13 (2.7)
50,001- 60,000	-	5 (1.1)	-	18 (3.7)	-	-	6 (1.1)	8 (1.6)
60,001- 70,000	-	2 (0.4)	-	18 (3.7)	-	-	-	5 (1.0)
70,001- 80,000	-	-	-	3 (0.6)	-	-	-	3 (0.6)
80,001- 90,000	-	-	-	4 (0.8)	-	-	-	1 (0.2)
90,001-100,000	-	-	-	-	-	-	0 (0.0)	
100,000 +	-	-	-	-	-	-	1 (0.2)	
Total	481	469	490	490	514	532	532	487

Table 9. A measure of the repeatability of success of catching pink salmon by seiners. The top 100 seiners in terms of pink salmon landings were identified each year (diagonal in table). The number of times that those 100 vessels were in the top 100 in previous and subsequent years is recorded by column. For example, of the top 100 seiners in 1974, 33 in were the top 100 in 1972 and 30 in the top 100 in 1976. Thirty or more vessels in each class is indicative of a significant statistical association.

	Year												
Year	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1969	100	28	31	22	32	17	19	17	18	23	17	20	10
1970	28	100	28	46	21	22	18	28	21	31	2	23	5
1971	31	28	100	34	38	30	19	29	20	23	10	23	8
1972	22	46	34	100	28	33	21	32	26	38	5	33	8
1973	32	21	38	28	100	23	25	19	16	18	15	16	15
1974	17	22	30	33	23	100	24	30	21	25	6	19	11
1975	19	18	19	21	25	24	100	33	35	22	18	13	18
1976	17	28	29	32	19	30	33	100	52	45	16	37	18
1977	18	21	20	26	16	21	35	52	100	49	19	39	21
1978	23	31	23	38	18	25	22	45	49	100	15	51	17
1979	17	2	10	5	15	6	18	16	19	15	100	21	42
1980	20	23	23	33	16	19	13	37	39	51	21	100	25
1981	10	5	8	8	15	11	18	18	21	17	42	25	100

Table 10. A measure of the repeatability of success of catching salmon by seiners. The top 100 seiners for each species in each year were identified (diagonal in tables). The number of times that the top 100 seiners for one species (e.g. 1967 pink salmon) were in the top 100 seiners for another species (e.g. 80 were also in the top 100 coho salmon landings) is listed. Thirty or more vessels in each class is indicative of a significant statistical association.

	Chinook	Sockeye	Coho	Pink	Chum
			1967		
Chinook	100	24	20	18	24
Sockeye		100	55	65	16
Coho			100	80	9
Pink				100	12
Chum					100
			1968		
Chinook	100	39	42	19	23
Sockeye		100	35	23	27
Coho			100	39	28
Pink				100	43
Chum					100
			1969		
Chinook	100	49	58	41	35
Sockeye		100	67	58	39
Coho			100	63	30
Pink				100	38
Chum					100
			1970		
Chinook	100	55	54	12	12
Sockeye		100	50	7	22
Coho			100	32	34
Pink				100	59
Chum					100
			1971		
Chinook	100	54	57	32	31
Sockeye		100	77	17	14
Coho			100	18	17
Pink				100	35
Chum					100

Table 10 (cont'd)

	Chinook	Sockeye	Coho	Pink	Chum
			1972		
Chinook	100	55	46	17	36
Sockeye		100	42	7	37
Coho			100	52	55
Pink				100	36
Chum					100
			1973		
Chinook	100	439	37	36	36
Sockeye		100	66	42	22
Coho			100	44	21
Pink				100	40
Chum					100
			1974		
Chinook	100	37	38	25	36
Sockeye		100	50	12	24
Coho			100	9	16
Pink				100	41
Chum					100
			1975		
Chinook	100	49	28	42	43
Sockeye		100	29	53	46
Coho			100	30	9
Pink				100	45
Chum					100
			1976		
Chinook	100	51	47	25	33
Sockeye		100	46	19	30
Coho			100	25	28
Pink				100	33
Chum					100

Table 10 (cont'd)

	Chinook	Sockeye	Coho	Pink	Chum
			1977		
Chinook	100	45	48	20	21
Sockeye		100	44	20	14
Coho			100	11	5
Pink				100	67
Chum					100
			1978		
Chinook	100	31	35	24	33
Sockeye		100	27	6	36
Coho			100	38	37
Pink				100	28
Chum					100
			1979		
Chinook	100	28	40	38	30
Sockeye		100	27	25	15
Coho			100	66	19
Pink				100	28
Chum					100
			1980		
Chinook	100	32	33	13	36
Sockeye		100	29	4	26
Coho			100	17	39
Pink				100	27
Chum					100
			1981		
Chinook	100	30	41	39	24
Sockeye		100	28	31	12
Coho			100	47	19
Pink				100	45
Cnum					100
			1967-81		
Chinook	100	42	42	27	30
Sockeye		100	45	26	25
Coho			100	35	24
Pink				100	38
Chum					100

Table 11. Number of trollers accounting for varying percentages of the total troll-caught landings of pink salmon, 1967-1981.

Percent of total landings	Year															
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1967-1981
10	36	13	29	20	30	10	29	8	21	9	37	24	45	13	50	25
20	86	28	70	46	78	22	73	21	51	27	89	58	112	31	118	61
30	147	48	124	83	140	38	127	37	92	49	153	100	195	56	198	106
40	221	73	191	138	219	58	192	62	145	79	234	153	291	92	289	162
50	309	108	279	217	316	86	273	98	212	117	331	222	405	141	396	234
60	418	162	391	320	436	135	379	158	299	173	449	306	540	204	524	326
70	553	252	536	462	585	223	516	255	415	258	603	415	707	294	683	450
80	734	386	731	664	784	366	698	401	578	391	807	563	918	435	888	623
90	990	606	1,027	1,009	1,082	603	974	637	836	643	1,110	800	1,226	691	1,197	896
100	2,877	2,047	2,511	2,604	2,608	1,932	2,245	1,955	2,110	2,005	2,551	2,142	2,725	2,480	2,608	2,360

Table 12. Frequency (and percentage) of vessels landing pink salmon in British Columbia using troll gear, 1967-1981.

Catch interval (pieces)	Year 1967	1968	1969	1970	1971	1972	1973	1974
1-1000	2128 (74.0)	1845 (90.1)	2347 (93.5)	2277 (87.4)	2199 (84.3)	1732 (89.6)	1862 (82.9)	1826 (93.4)
1001-2000	385 (13.4)	84 (4.1)	138 (5.5)	209 (8.0)	290 (11.1)	88 (4.6)	245 (10.9)	69 (3.5)
2001-3000	187 (6.5)	50 (2.4)	22 (0.9)	45 (1.7)	79 (3.0)	25 (1.3)	100 (4.5)	21 (1.1)
3001-4000	96 (3.3)	11 (0.5)	3 (0.1)	28 (1.1)	22 (0.8)	22 (1.1)	23 (1.0)	17 (0.9)
4001-5000	49 (1.7)	27 (1.3)	1 (0.0)	21 (0.8)	13 (0.5)	17 (0.9)	7 (0.3)	11 (0.6)
5001-6000	16 (0.6)	14 (0.5)	-	13 (0.5)	4 (0.2)	14 (0.7)	7 (0.3)	3 (0.2)
6001-7000	10 (0.0)	10 (0.5)	-	7 (0.3)	-	12 (0.6)	1 (0.0)	3 (0.2)
7001-8000	1 (0.0)	6 (0.3)	-	1 (0.0)	1 (0.0)	7 (0.4)	-	1 (0.2)
8000 +	5 (0.2)	-	-	3 (0.1)	-	15 (0.7)	-	4 (0.2)
Total	2877	2047	2511	2604	2608	1932	2245	1955

Catch interval (pieces)	Year 1975	1976	1977	1978	1979	1980	1981	1967-1981
1-1000	1879 (89.1)	1809 (90.2)	1683 (66.0)	2064 (96.4)	1493 (54.8)	2136 (86.1)	1359 (52.1)	1910 (80.9)
1001-2000	162 (7.7)	99 (4.9)	414 (16.2)	74 (3.5)	462 (17.0)	163 (6.6)	414 (15.9)	220 (9.3)
2001-3000	50 (2.4)	46 (2.3)	221 (8.7)	3 (0.1)	313 (11.5)	78 (3.1)	290 (11.1)	102 (4.3)
3001-4000	11 (0.5)	26 (1.3)	101 (4.0)	1 (0.0)	192 (7.0)	39 (1.6)	186 (7.1)	52 (2.2)
4001-5000	6 (0.3)	16 (0.8)	66 (2.6)	-	126 (4.6)	16 (0.6)	134 (5.1)	34 (1.4)
5001-6000	1 (0.0)	3 (0.1)	31 (1.2)	-	61 (2.2)	14 (0.6)	109 (4.2)	19 (0.8)
6001-7000	-	2 (0.1)	15 (0.6)	-	40 (1.5)	9 (0.4)	56 (2.1)	11 (0.5)
7001-8000	1 (0.0)	1 (0.0)	13 (0.5)	-	17 (0.6)	7 (0.3)	25 (1.0)	5 (0.2)
8000 +	-	3 (0.1)	7 (0.3)	-	21 (0.8)	18 (0.8)	35 (1.3)	7 (0.3)
Total	2110	2005	2551	2142	2725	2480	2608	2360

Table 13. A measure of the repeatability of success of catching pink salmon by trollers. The top 200 trollers in terms of pink salmon landings were identified each year (diagonal in table). The number of times that those 200 vessels were in the top 200 in previous and subsequent years is recorded by column. For example, of the top 200 trollers in 1977, 57 were in the top 200 in 1973 and 72 in the top 200 in 1979. Twenty-five or more vessels in each year is indicative of a significant statistical association.

	Year														
Year	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
1967	200	21	50	40	52	24	42	26	32	23	28	15	24	21	22
1968	21	200	13	19	14	11	18	21	9	9	8	9	9	6	7
1969	50	13	200	56	53	30	45	18	31	19	22	13	21	7	21
1970	40	19	56	200	43	64	36	42	16	32	17	20	8	8	8
1971	52	14	53	43	200	36	77	29	43	34	41	22	32	22	31
1972	24	11	30	64	36	200	39	67	29	38	19	27	15	16	14
1973	42	18	45	36	77	39	200	46	68	42	57	25	36	18	32
1974	26	21	18	42	29	67	46	200	33	63	25	35	23	18	13
1975	32	9	31	16	43	29	68	33	200	31	78	22	45	21	32
1976	23	9	19	32	34	38	42	63	31	200	35	50	25	19	16
1977	28	8	22	17	41	19	57	25	78	35	200	46	72	45	47
1978	15	9	13	20	22	27	25	35	22	50	46	200	35	40	29
1979	24	9	21	8	32	15	36	23	45	25	72	35	200	33	72
1980	21	6	7	8	22	16	18	18	21	19	45	40	33	200	41
1981	22	7	21	8	31	14	32	13	32	16	47	29	72	41	200

Table 14. A measure of the repeatability of success of catching salmon by trollers. The top 200 trollers for each species in each year were identified (diagonal in tables). The number of times that the top 200 trollers for one species (e.g. 1967 pink salmon) were in the top 200 trollers for another species (e.g. 76 were also in the top 100 coho salmon landings) is listed. Twenty-five or more vessels in each class is indicative of a significant statistical association.

	Chinook	Sockeye	Coho	Pink	Chum
			1967		
Chinook	200	36	76	39	20
Sockeye		200	33	74	13
Coho			200	71	35
Pink				200	49
Chum					200
			1968		
Chinook	200	56	71	6	20
Sockeye		200	108	17	16
Coho			200	31	33
Pink				200	36
Chum					200
			1969		
Chinook	200	28	83	19	7
Sockeye		200	49	95	38
Coho			200	41	18
Pink				200	74
Chum					200
			1970		
Chinook	200	19	81	15	13
Sockeye		200	23	46	42
Coho			200	16	19
Pink				200	87
Chum					200
			1971		
Chinook	200	27	58	39	18
Sockeye		200	42	95	35
Coho			200	59	31
Pink				200	53
Chum					200

Table 14 (cont'd)

	Chinook	Sockeye	Coho	Pink	Chum
			1972		
Chinook	200	28	83	9	25
Sockeye		200	19	13	14
Coho			200	14	37
Pink				200	91
Chum					200
			1973		
Chinook	200	19	99	36	16
Sockeye		200	21	63	33
Coho			200	56	15
Pink				200	41
Chum					200
			1974		
Chinook	200	53	88	19	16
Sockeye		200	66	16	23
Coho			200	14	16
Pink				200	37
Chum					200
			1975		
Chinook	200	29	81	41	25
Sockeye		200	41	43	27
Coho			200	57	27
Pink				200	79
Chum					200
			1976		
Chinook	200	22	65	6	29
Sockeye		200	10	43	42
Coho			200	20	19
Pink				200	31
Chum					200

Table 14 (cont'd)

	Chinook	Sockeye	Coho	Pink	Chum
			1977		
Chinook	200	29	75	59	23
Sockeye		200	9	76	62
Coho			200	61	21
Pink				200	79
Chum					200
			1978		
Chinook	200	55	67	13	16
Sockeye		200	60	46	53
Coho			200	22	35
Pink				200	70
Chum					200
			1979		
Chinook	200	41	62	40	30
Sockeye		200	53	50	22
Coho			200	50	22
Pink				200	68
Chum					200
			1980		
Chinook	20	28	53	23	21
Sockeye		200	5	31	63
Coho			200	12	8
Pink				200	67
Chum					200
			1981		
Chinook	200	54	45	36	11
Sockeye		200	8	34	35
Coho			200	71	27
Pink				200	58
Chum					200
			1967-1981		
Chinook	200	35	72	27	19
Sockeye		200	29	49	35
Coho			200	40	24
Pink				200	61
Chum					200

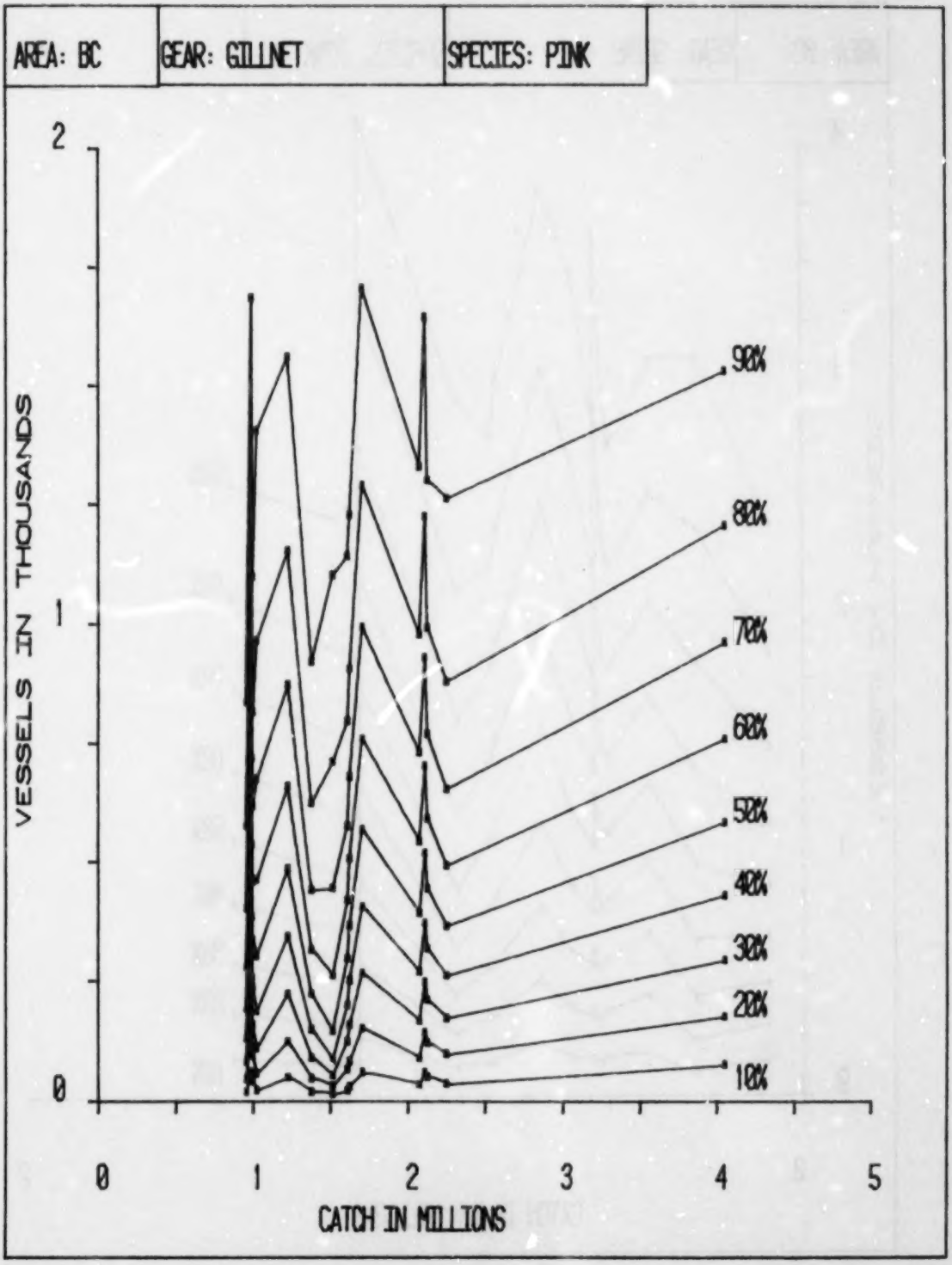

Fig. 1. Contour plots for the number of gillnetters that harvested a fixed percentage of the total annual catch of pink salmon by gillnetters versus the size of the annual catch during 1967-1981.

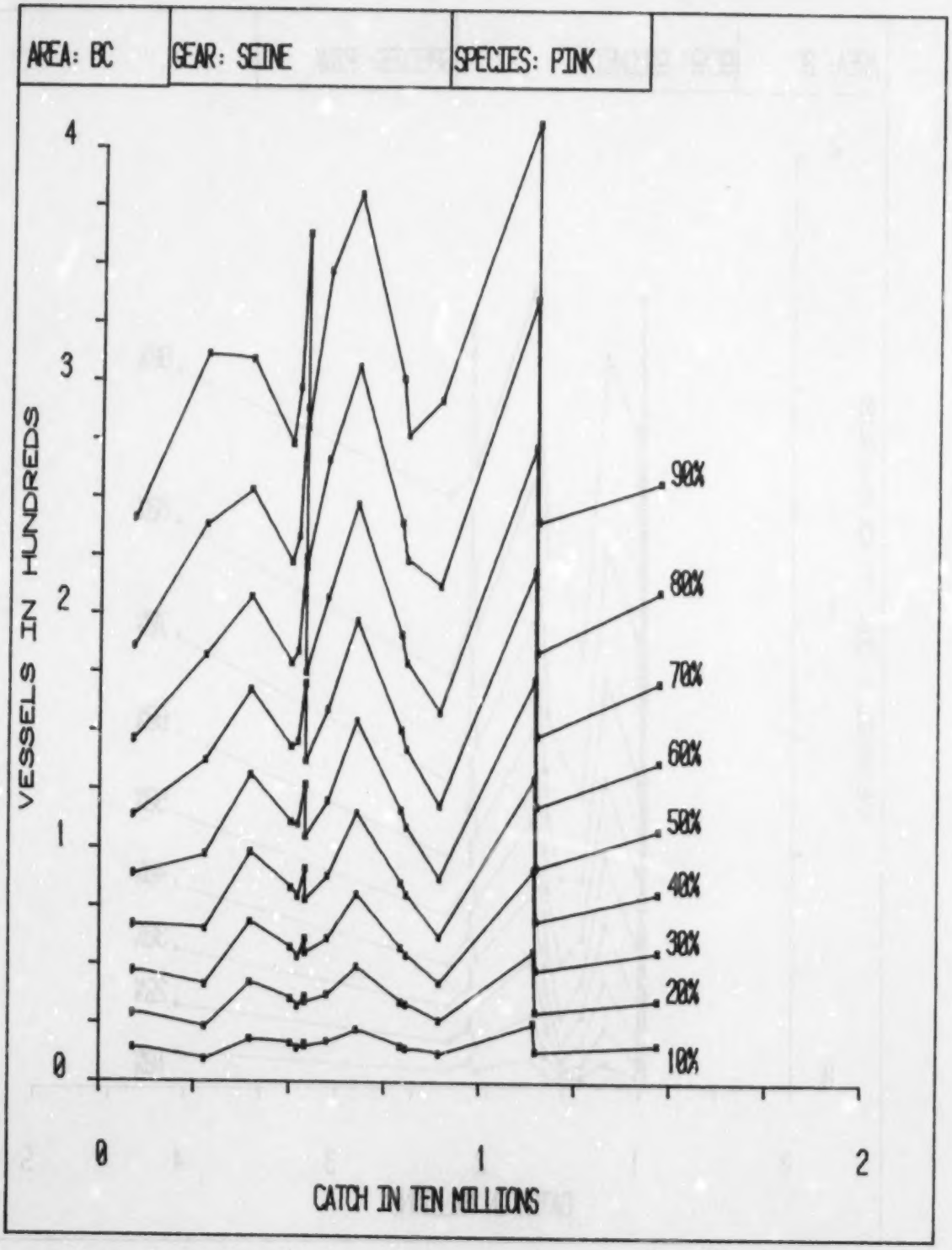

Fig. 2. Contour plots for the number of seiners that harvested a fixed percentage of the total annual catch of pink salmon by seiners versus the size of the annual catch during 1967-1981.

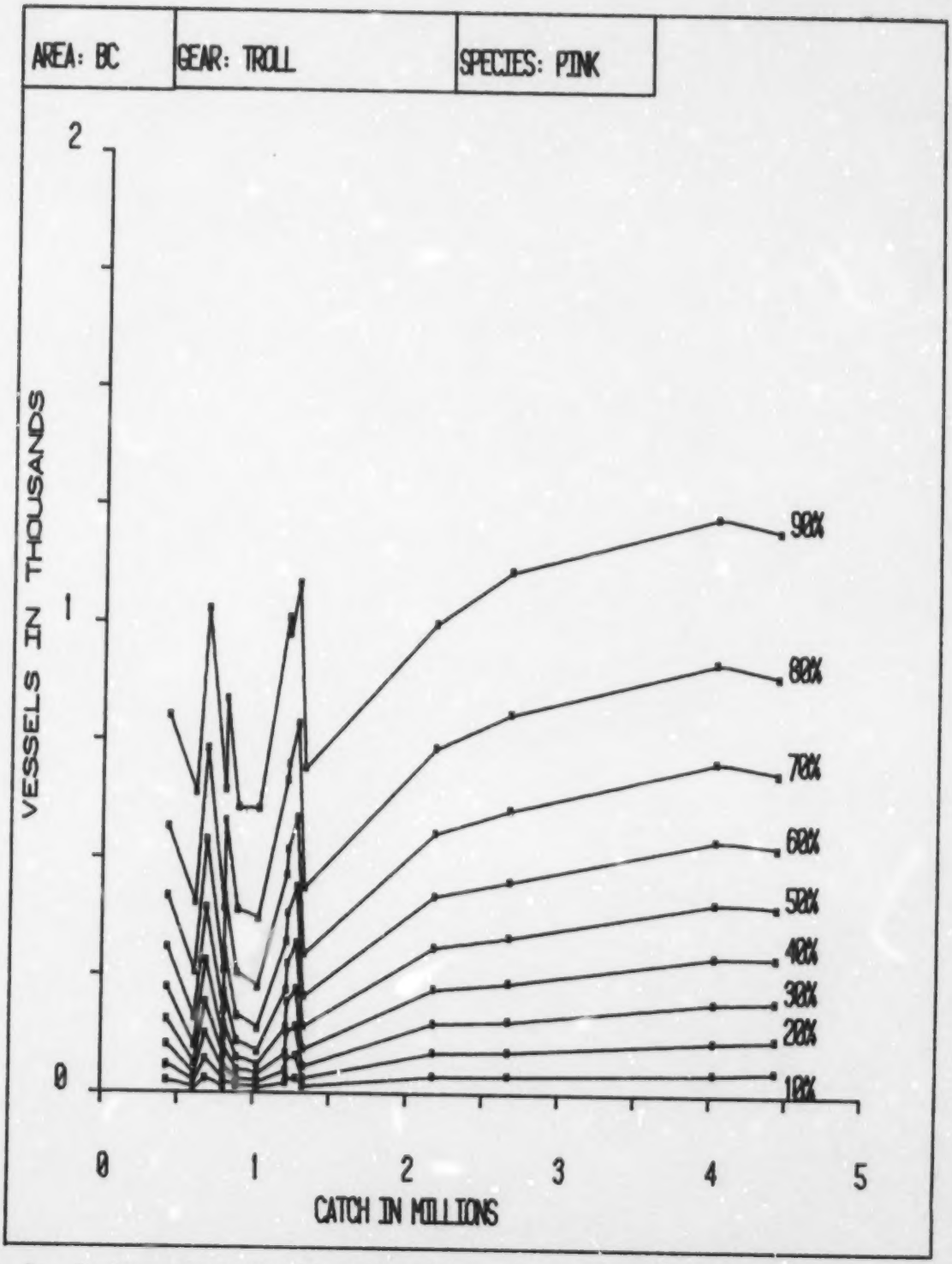

Fig. 3. Contour plots for the number of trollers that harvested a fixed percentage of the total annual catch of pink salmon by trollers versus the size of the annual catch during 1967-1981.

Appendix A.

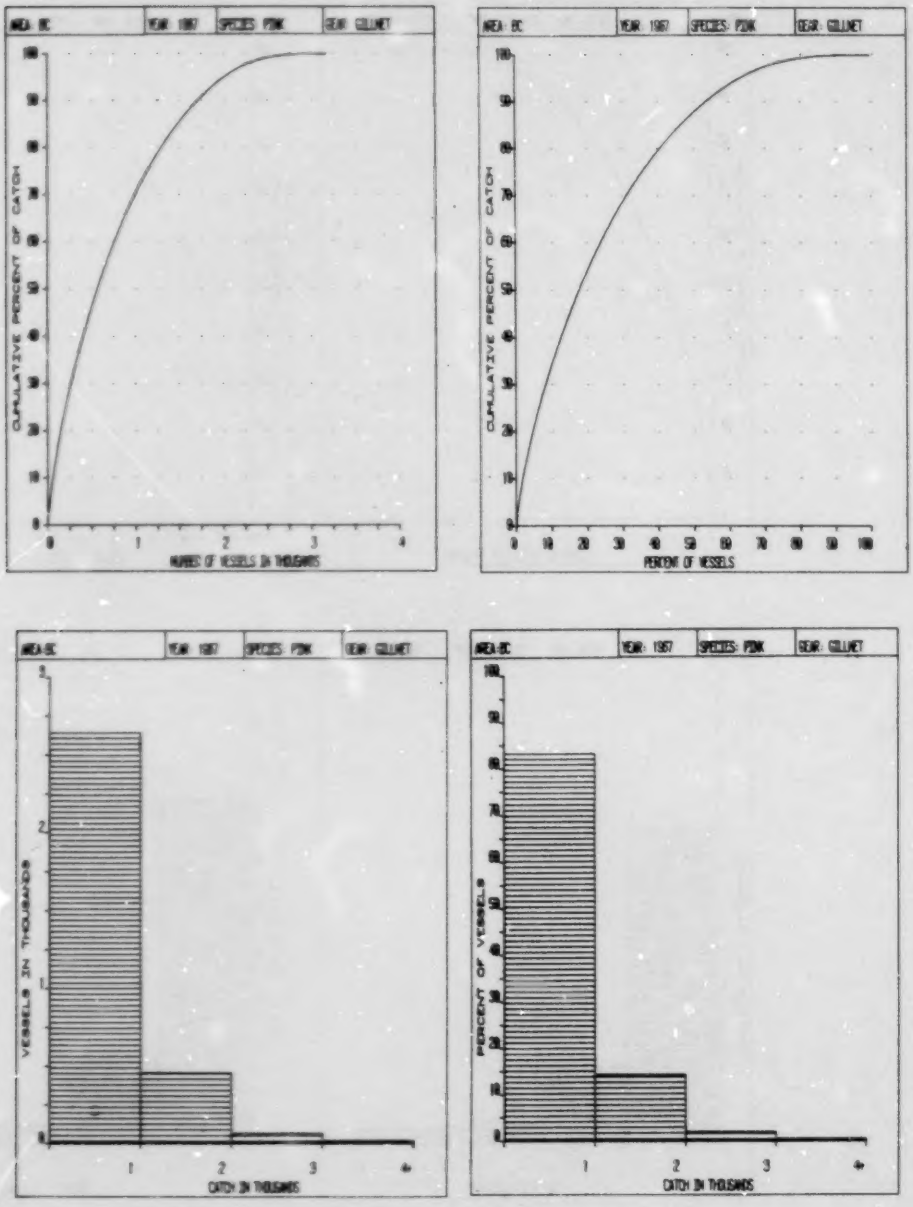

Fig. A1. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1967.

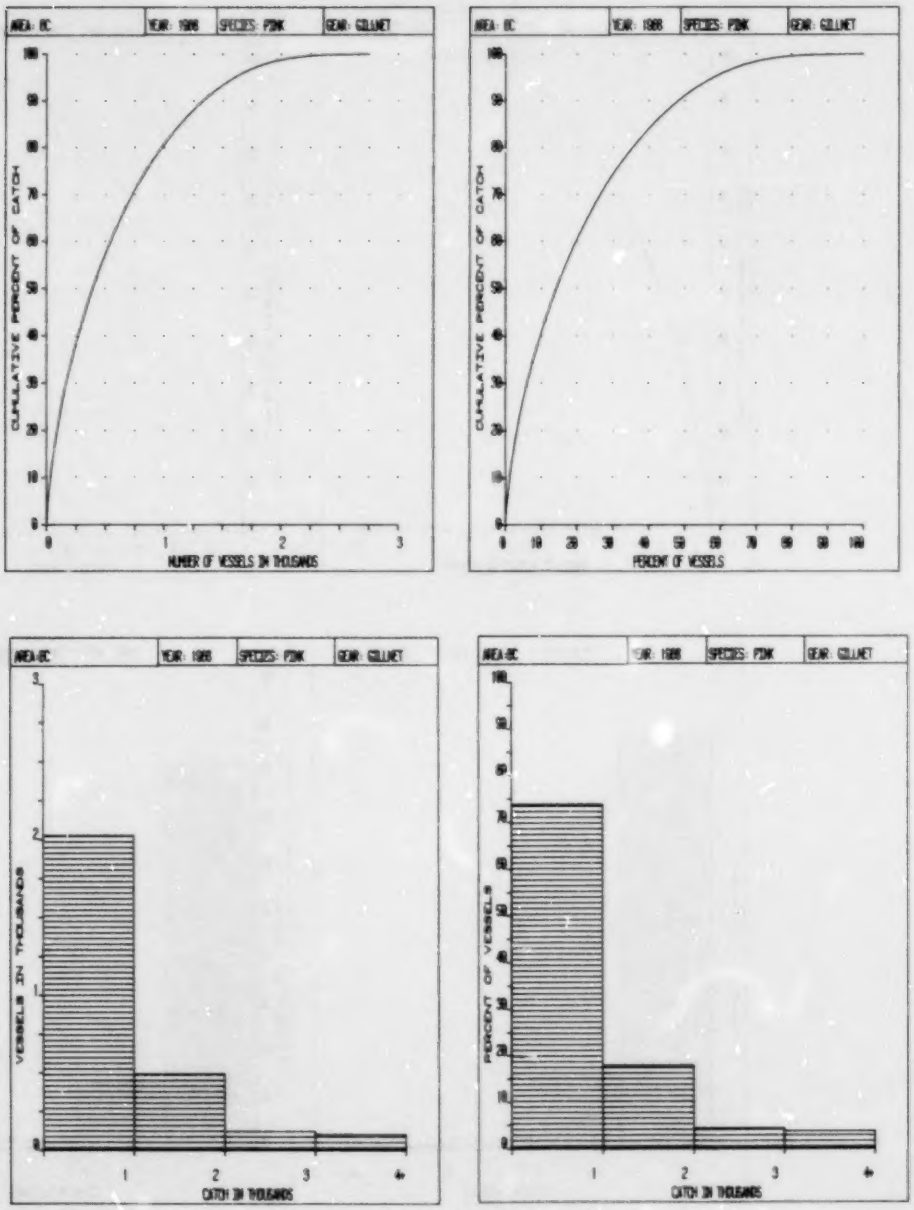

Fig. A2. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1968.

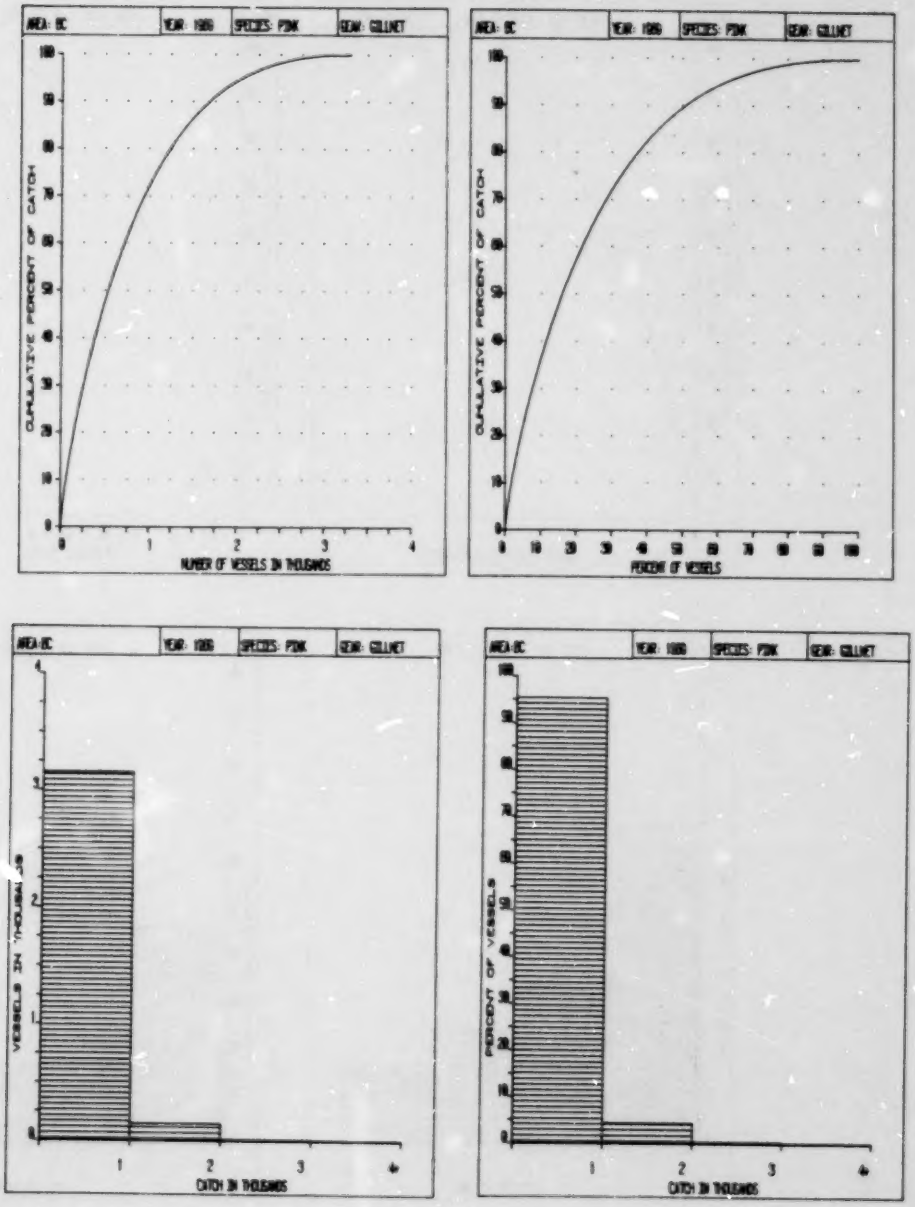

Fig. A3. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1969.

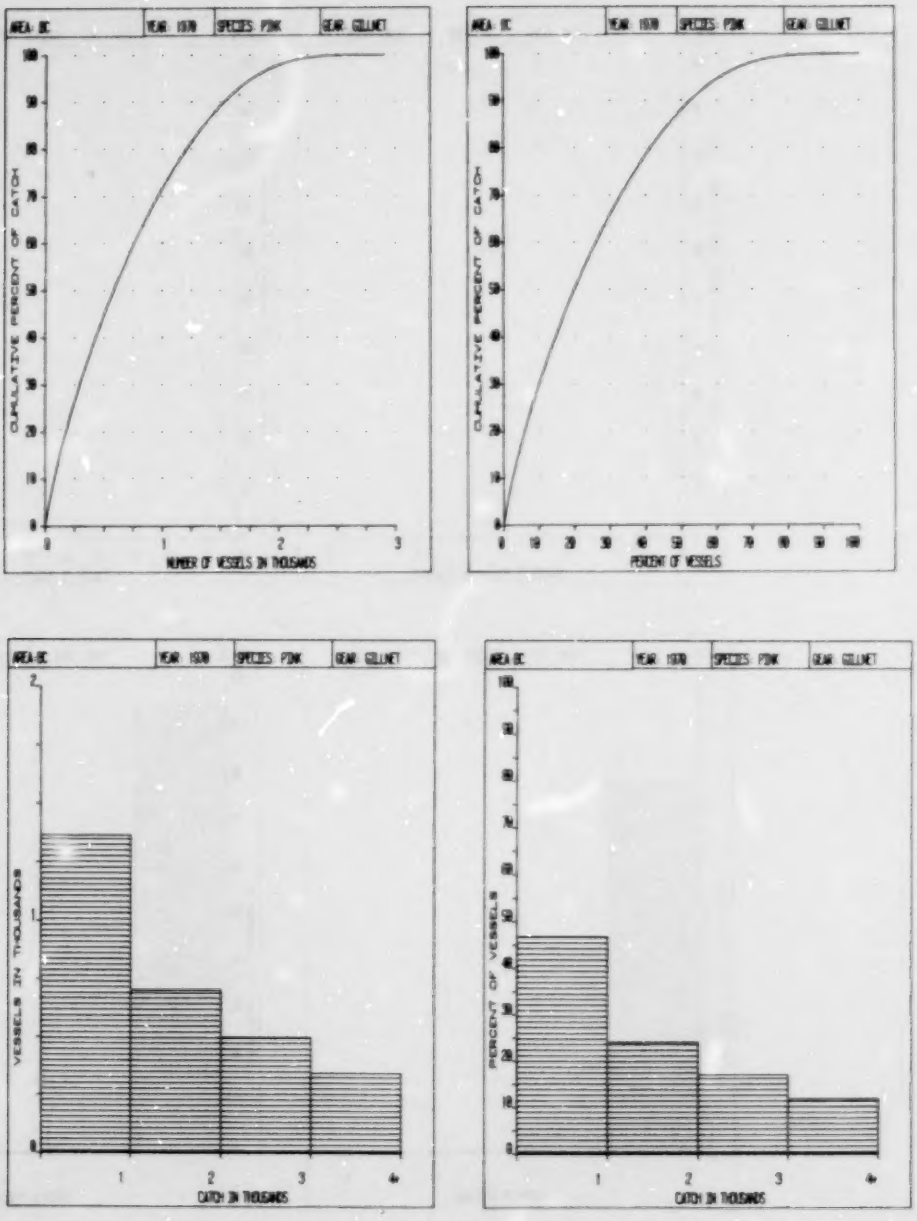

Fig. A4. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1970.

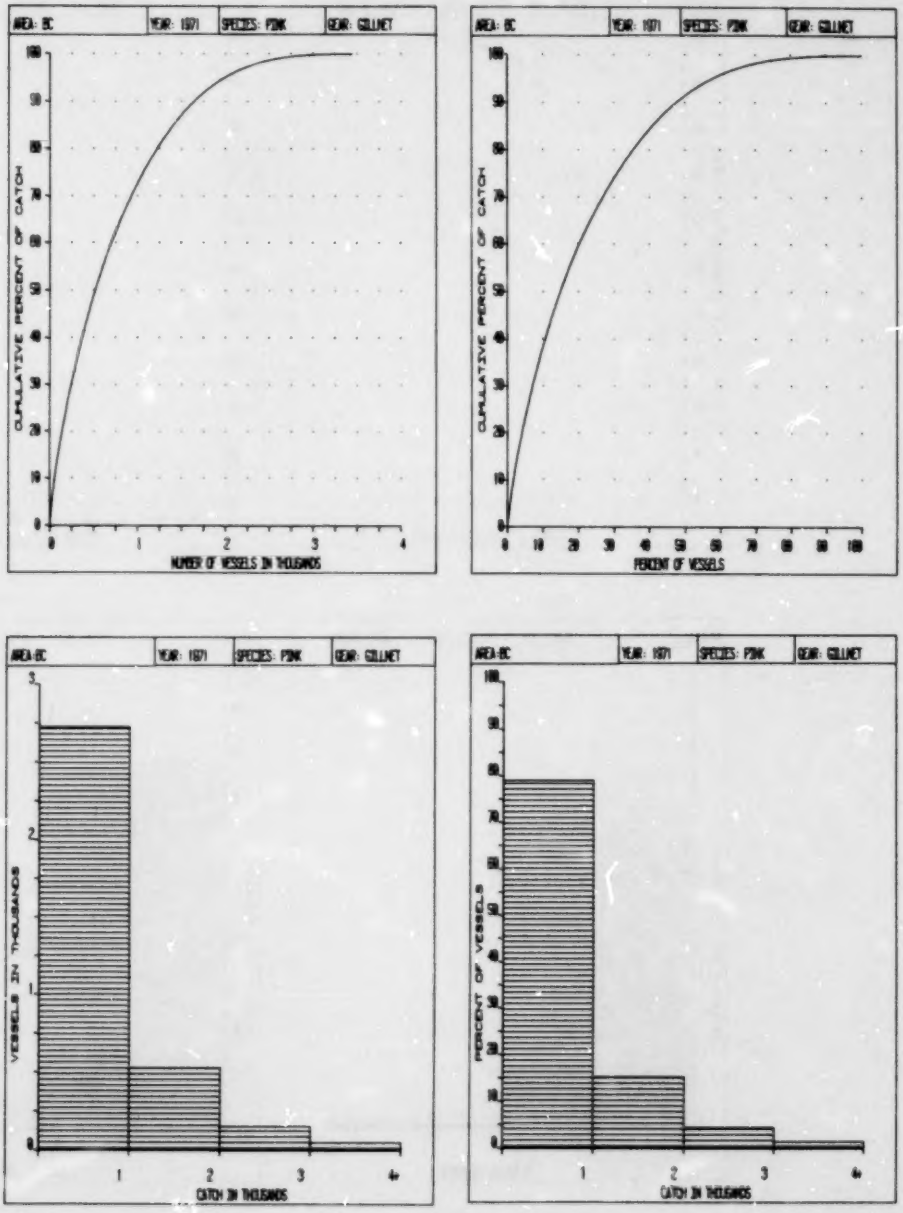

Fig. A5. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1971.

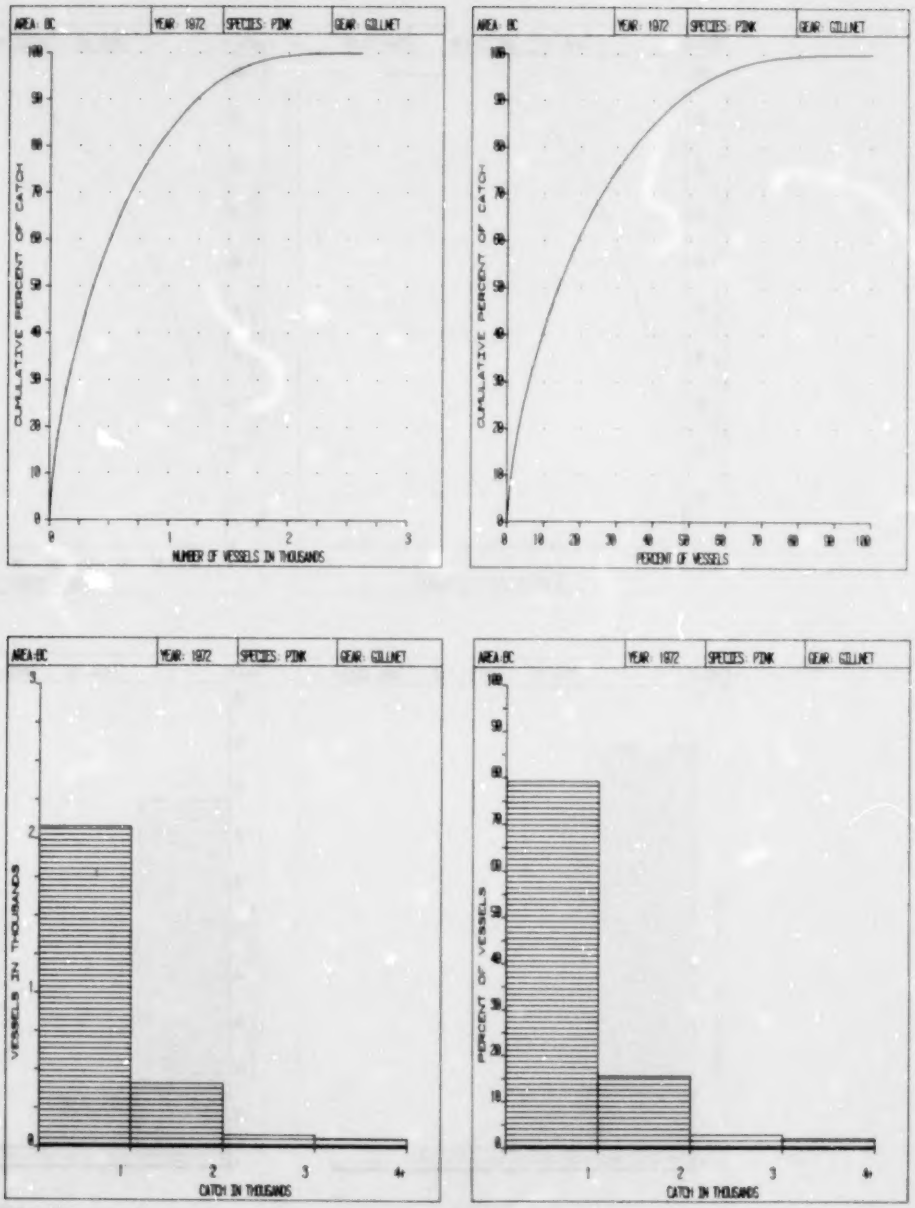

Fig. A6. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1972.

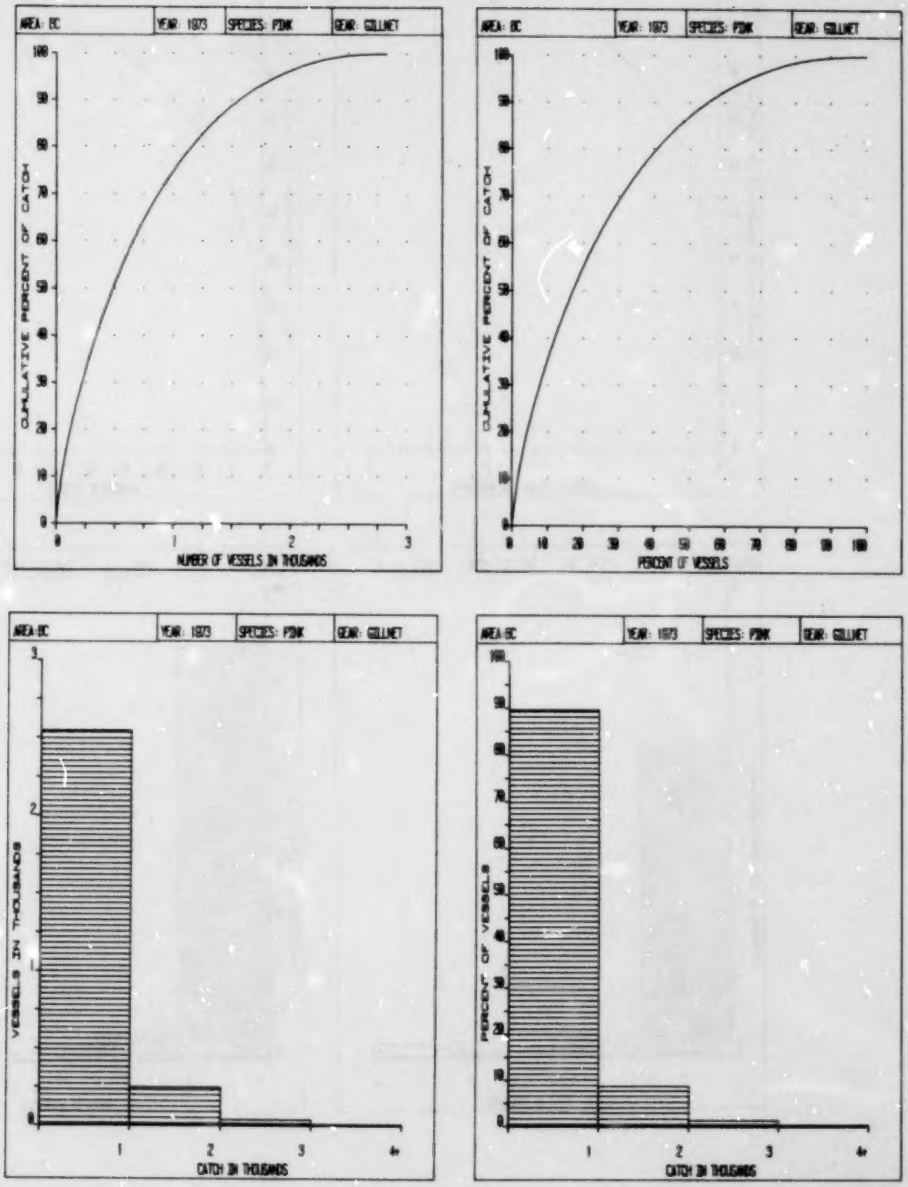

Fig. A7. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1973.

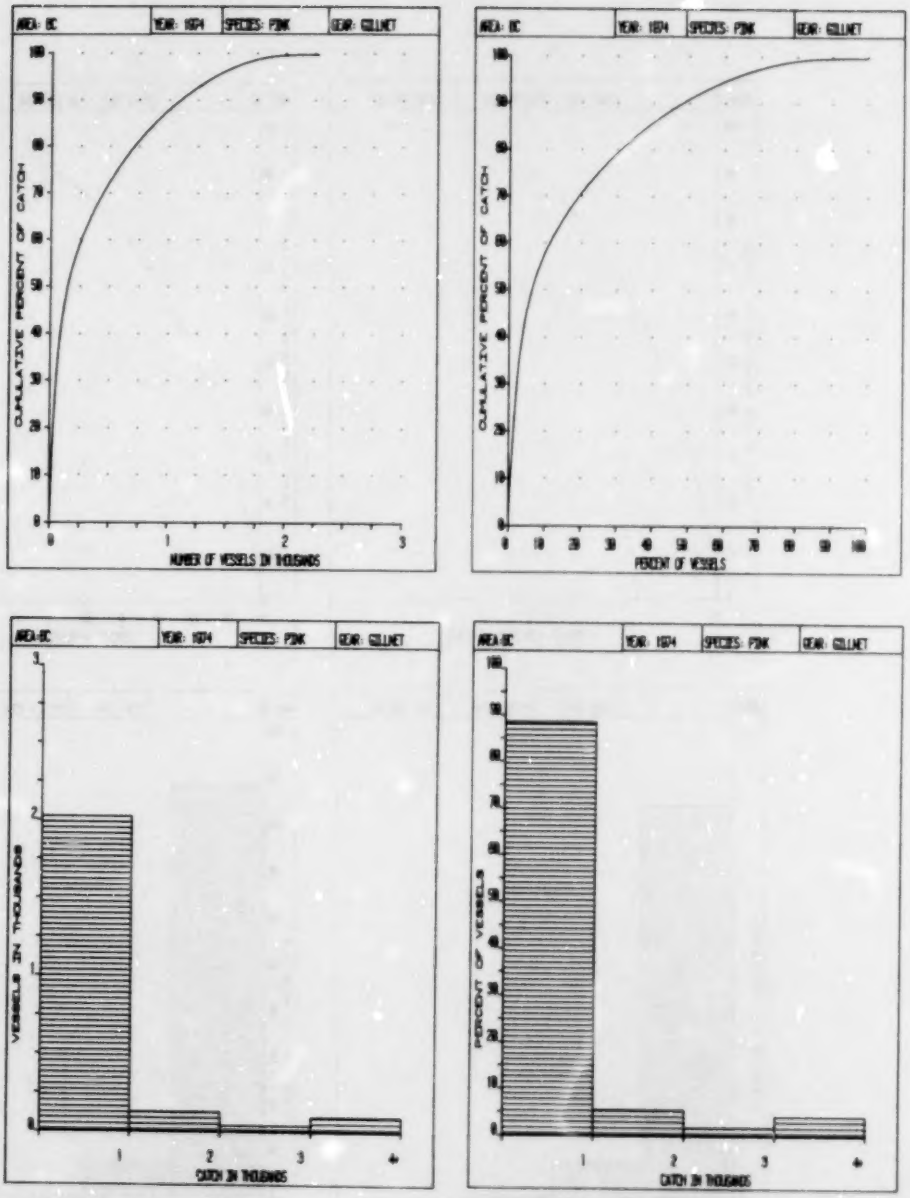

Fig. A8. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1974.

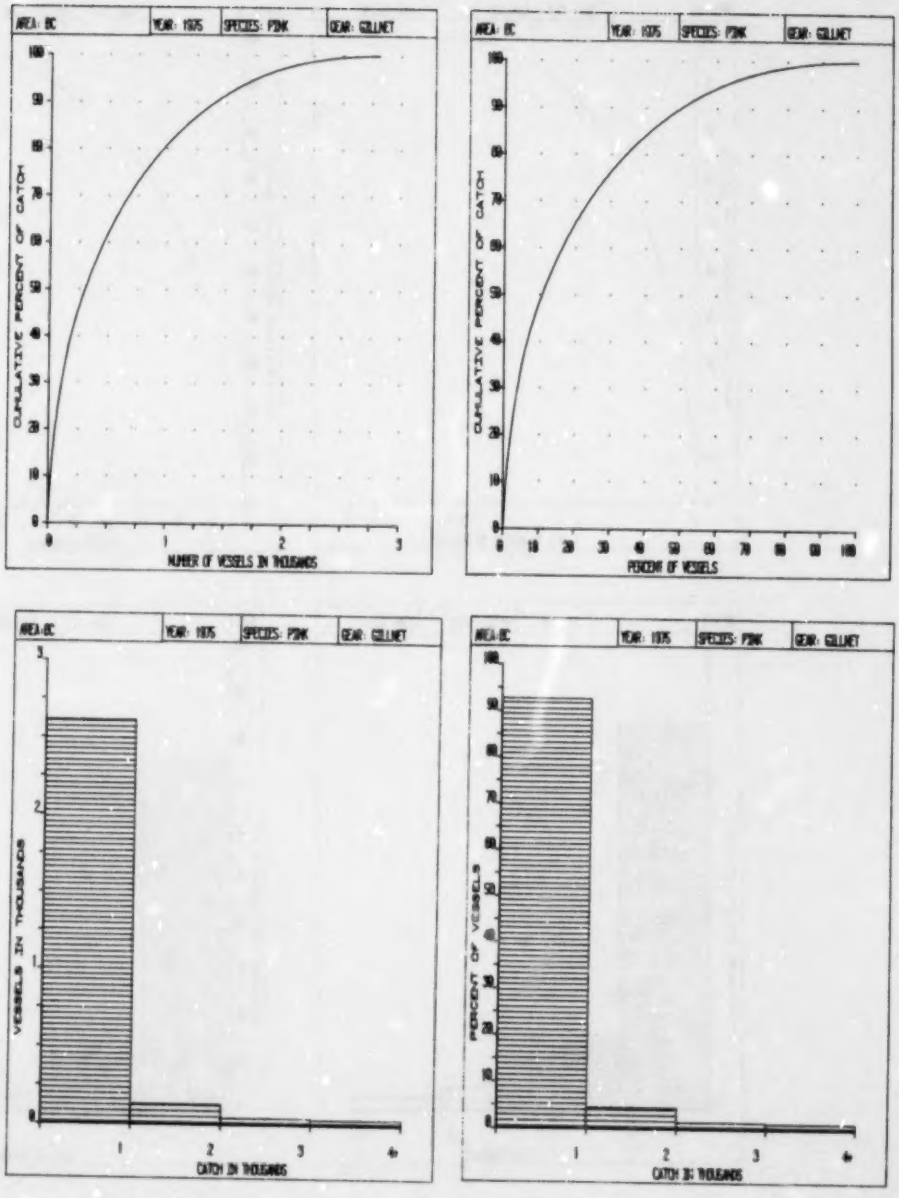

Fig. A9. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1975.

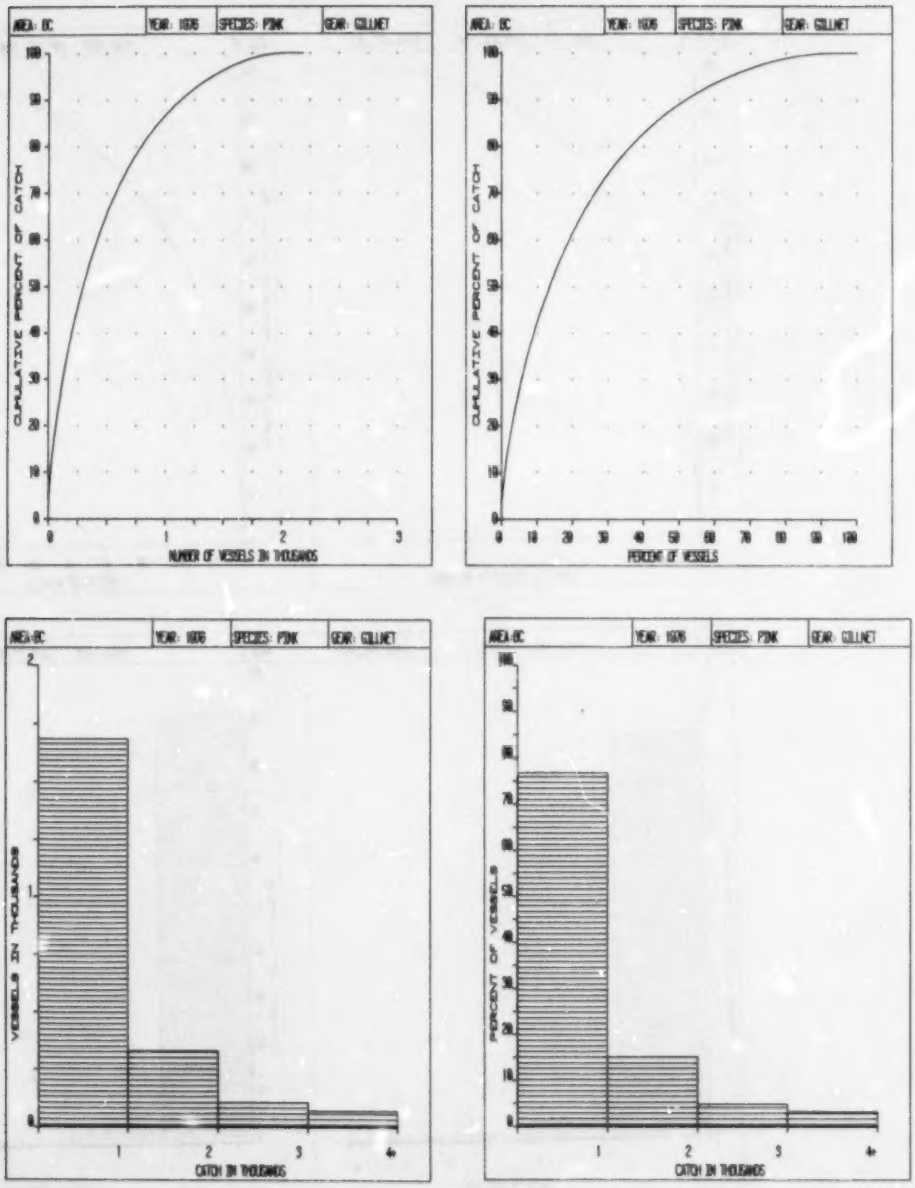

Fig. A10. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1976.

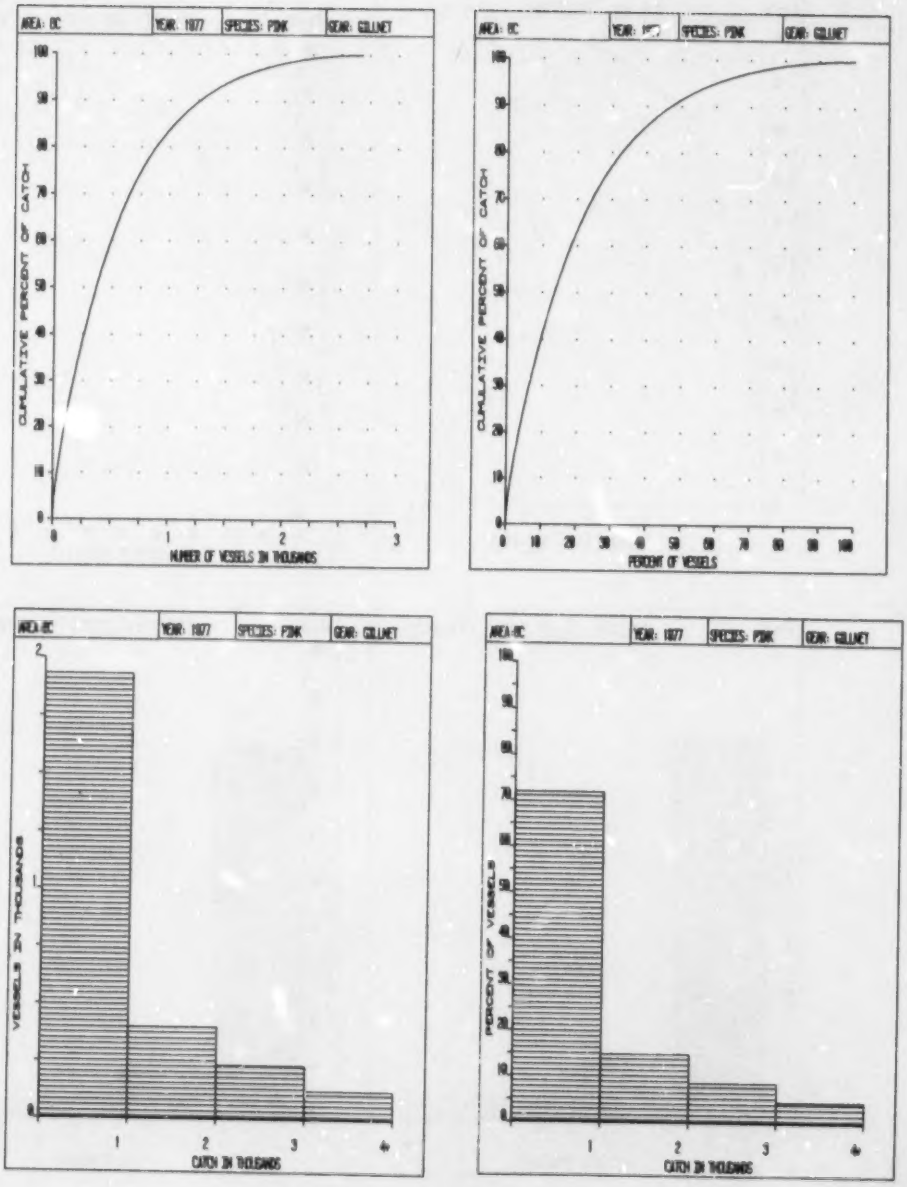

Fig. A11. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1977.

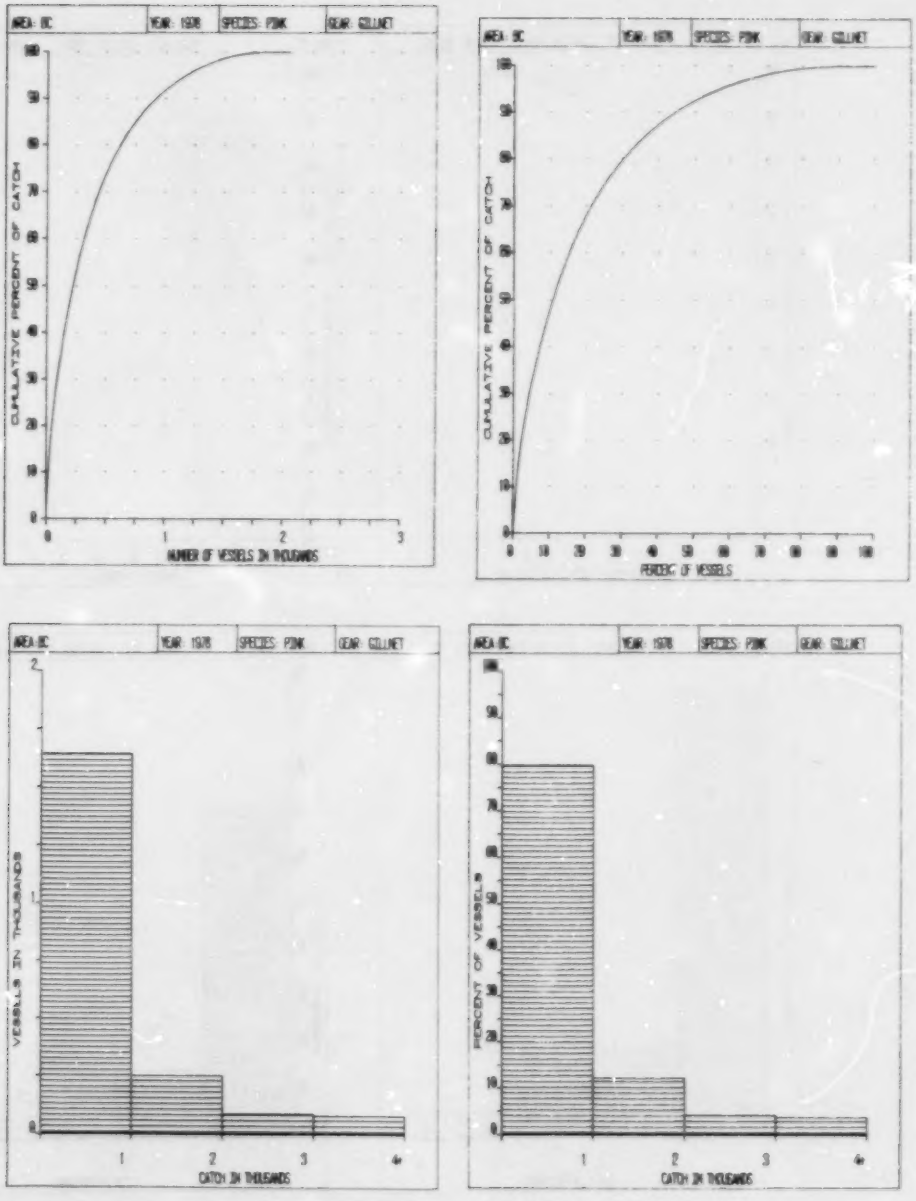

Fig. A12. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1978.

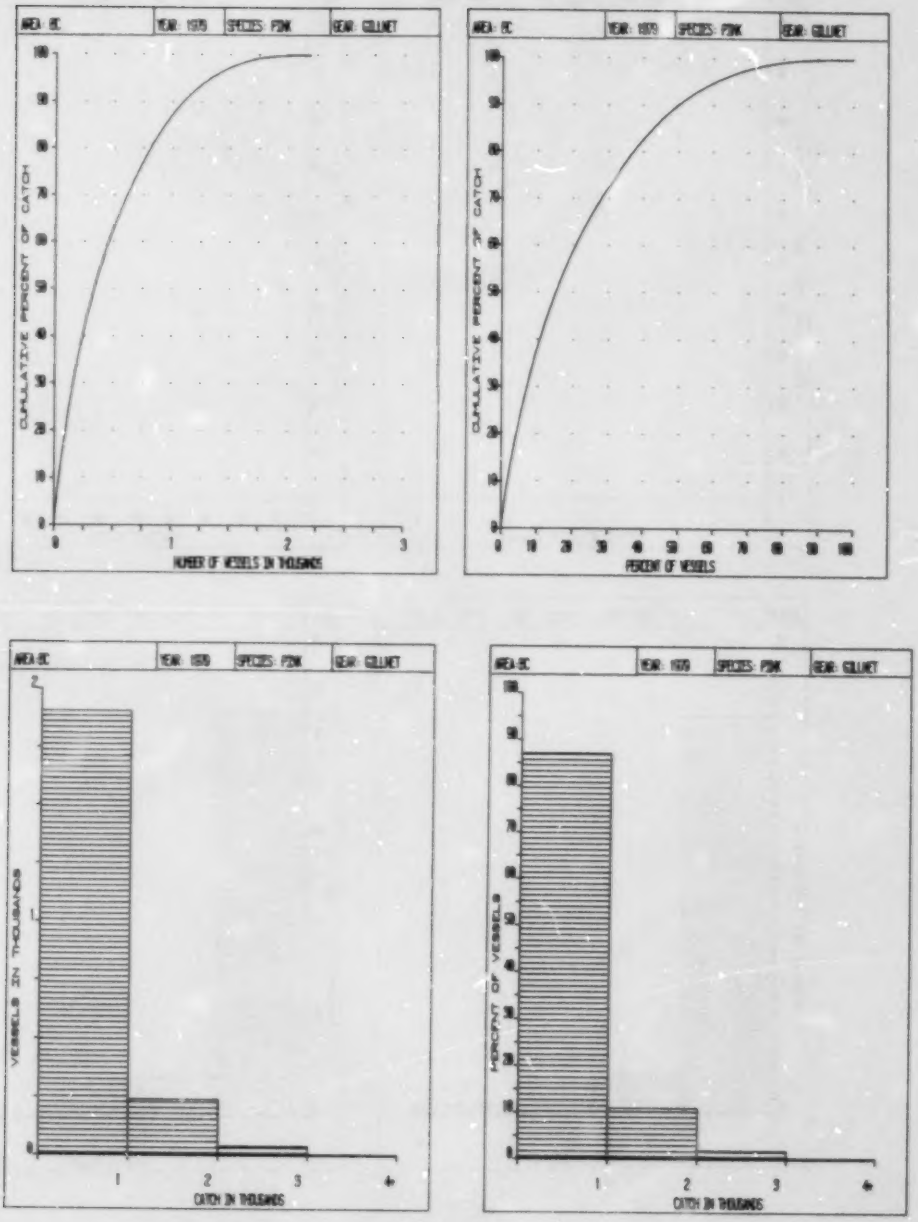

Fig. A13. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1979.

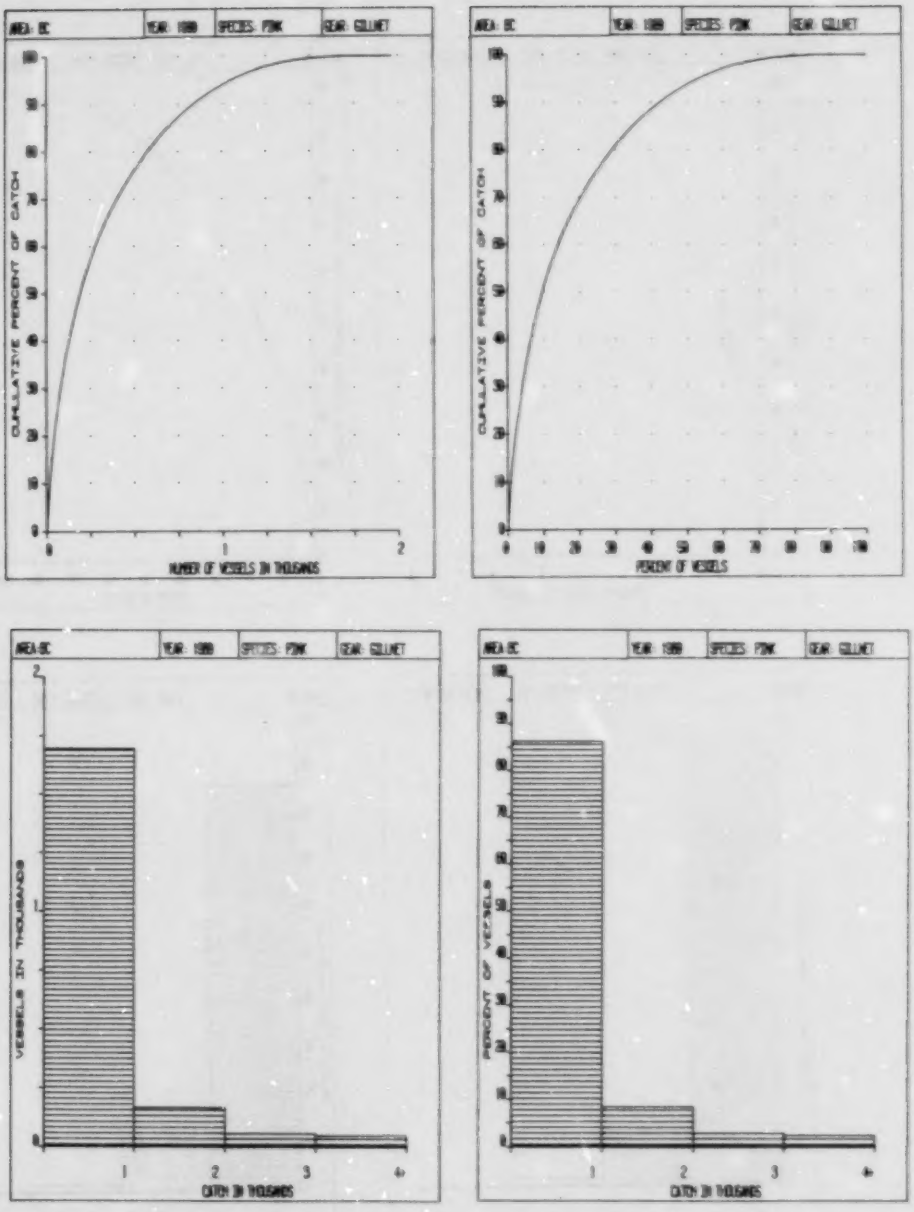

Fig. A14. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1980.

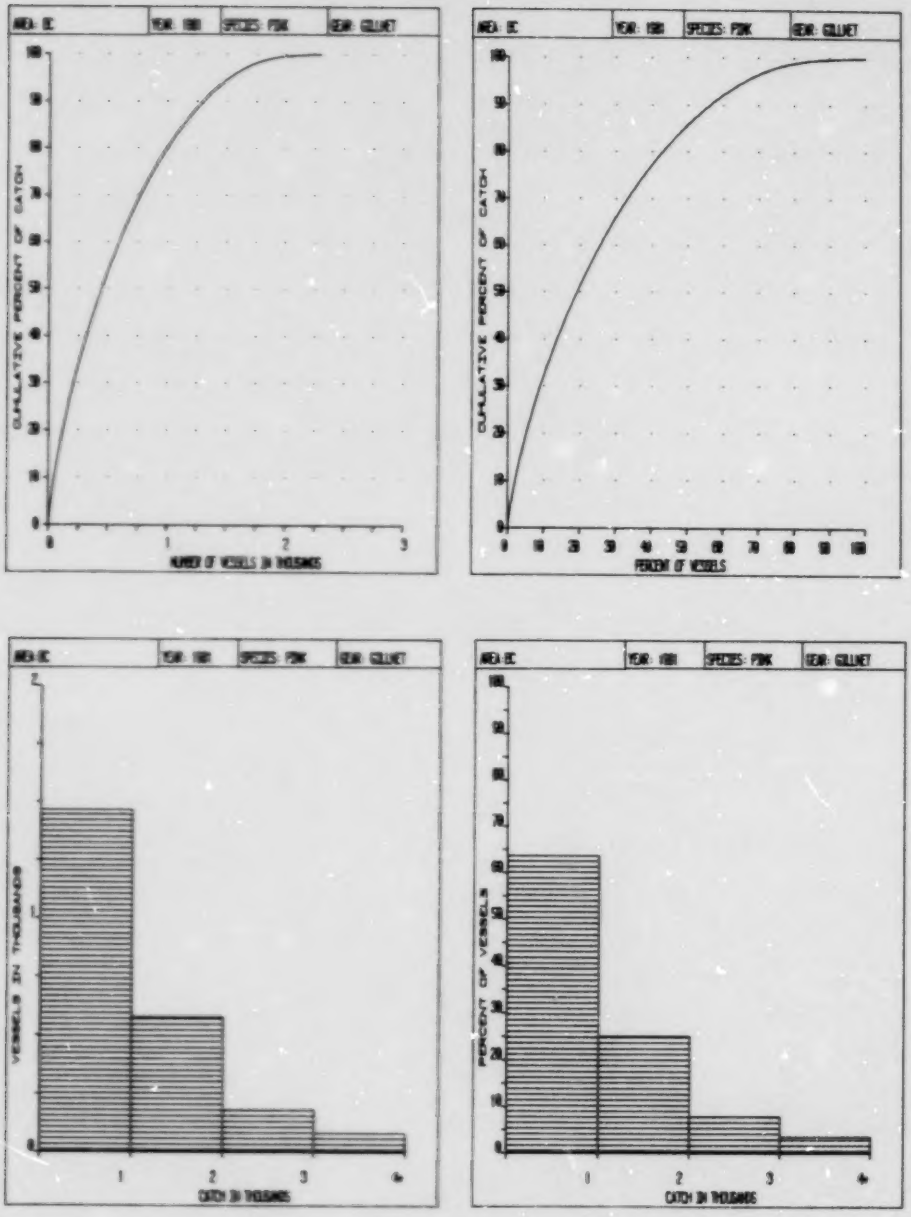

Fig. A15. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used gillnets and participated in the fishery, 1981.

Appendix B.

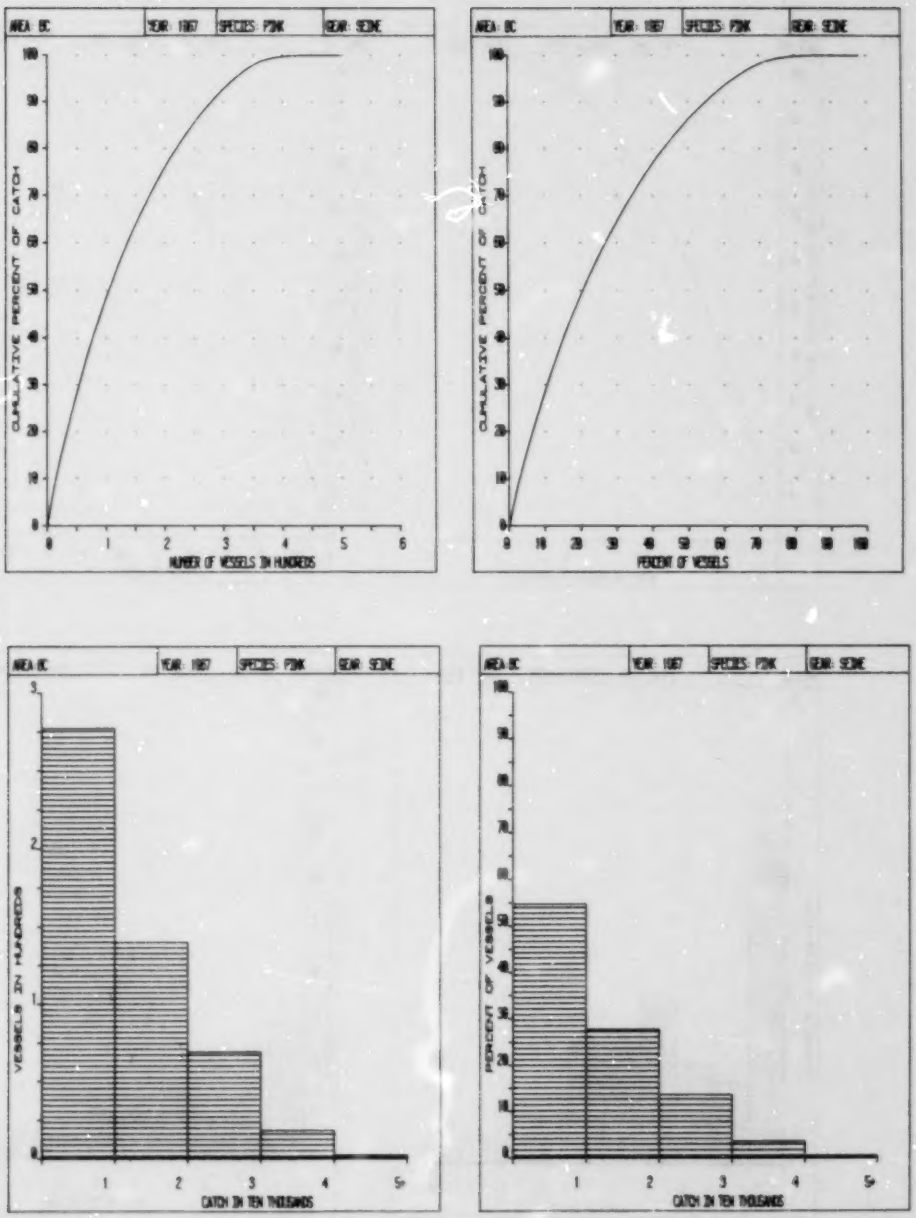

Fig. B1. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1967.

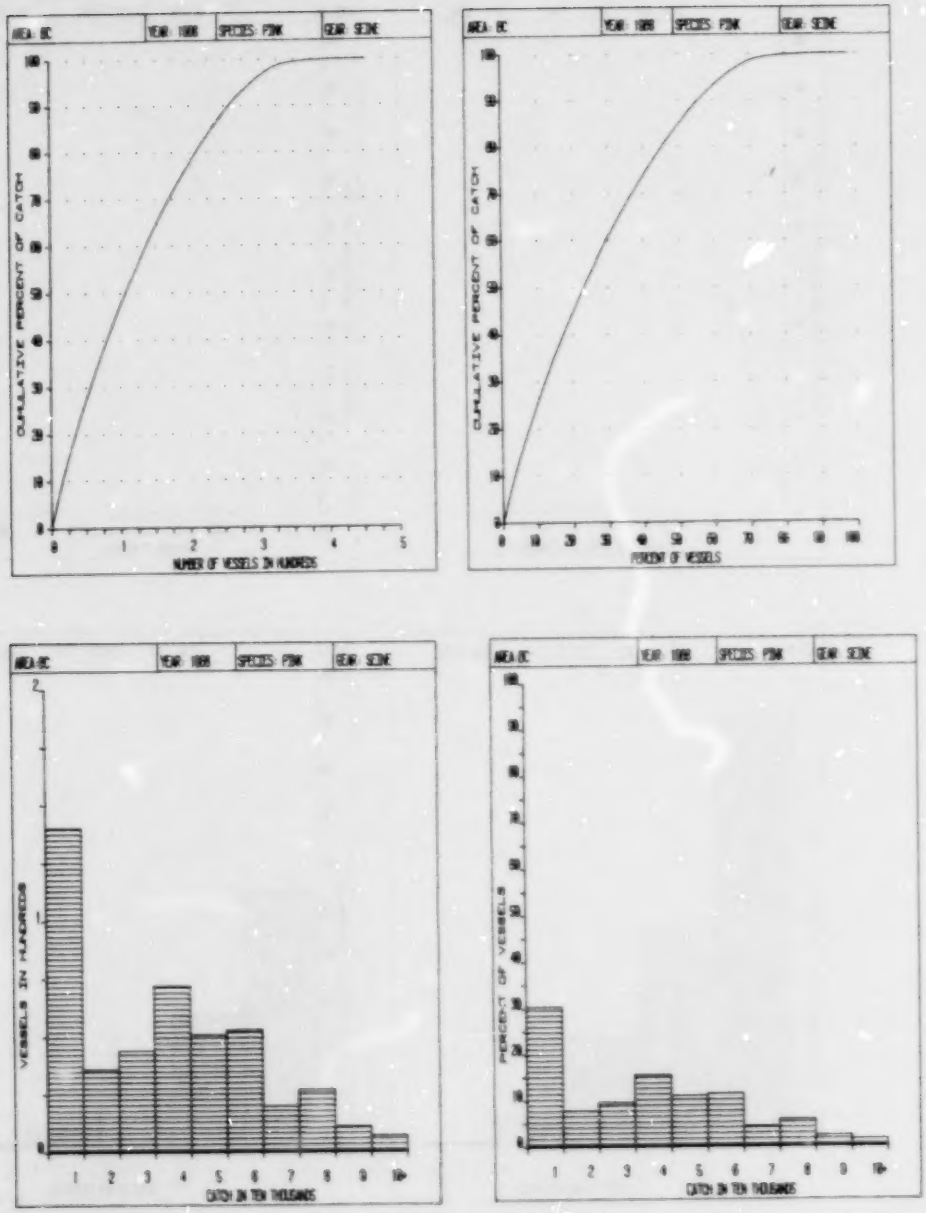

Fig. 82. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1968.

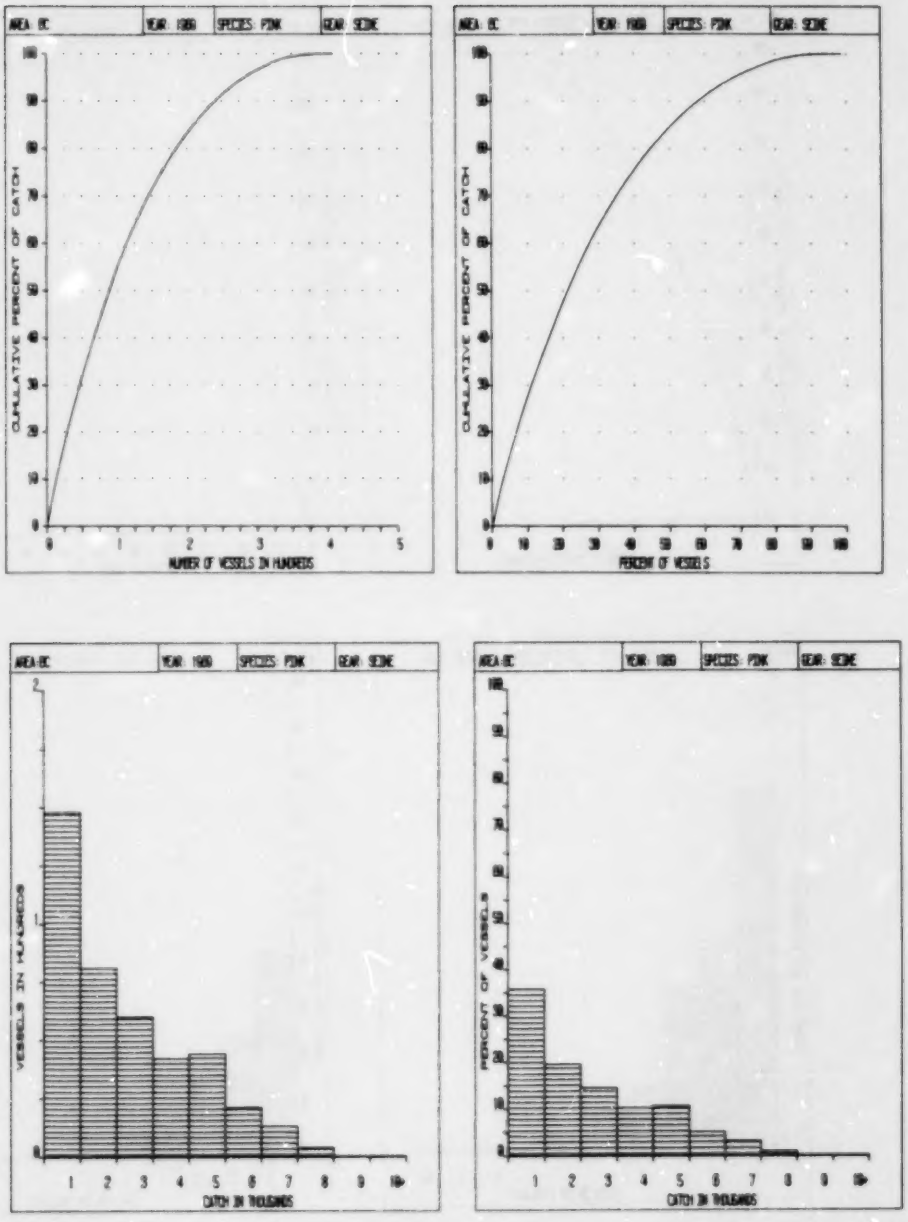

Fig. 53. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1969.

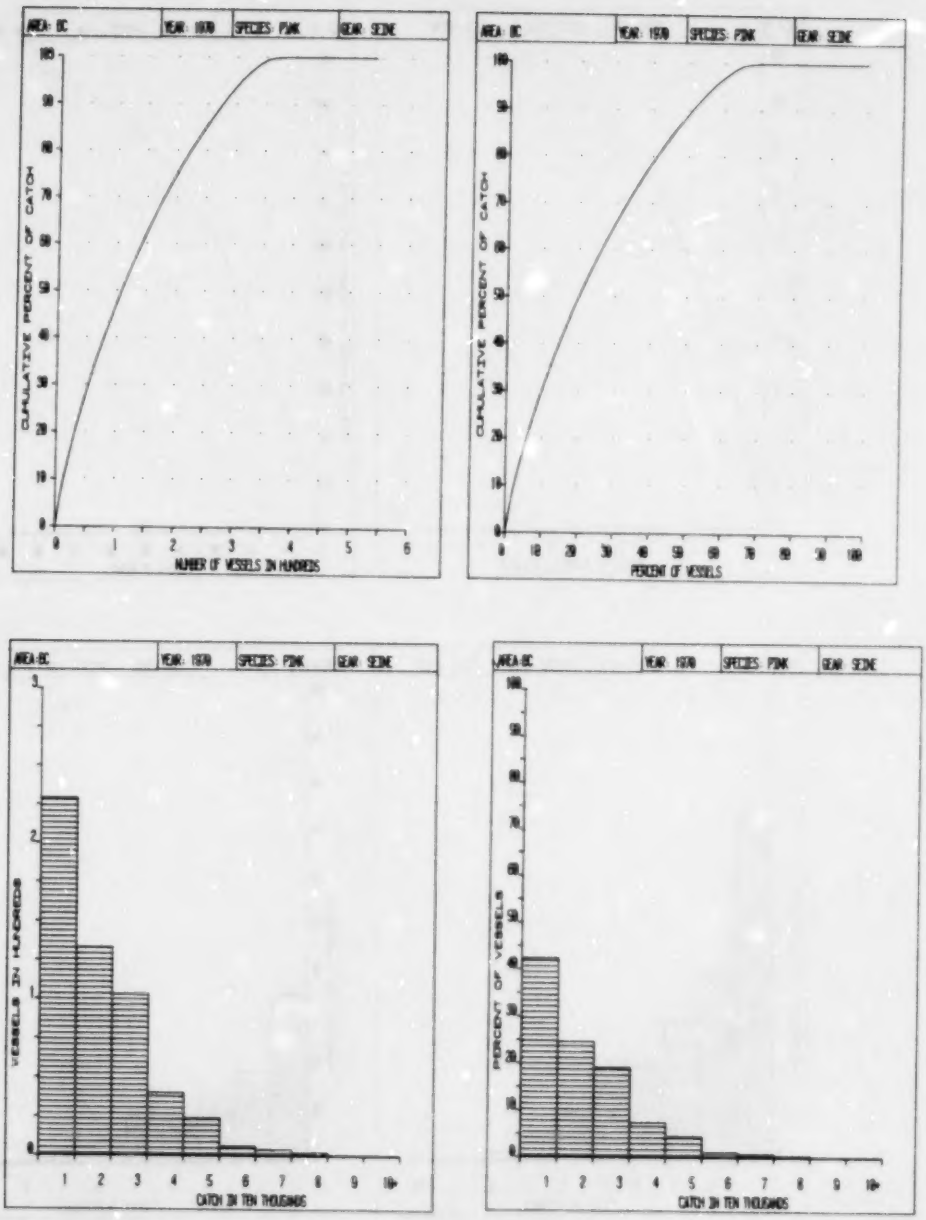

Fig. B4. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1970.

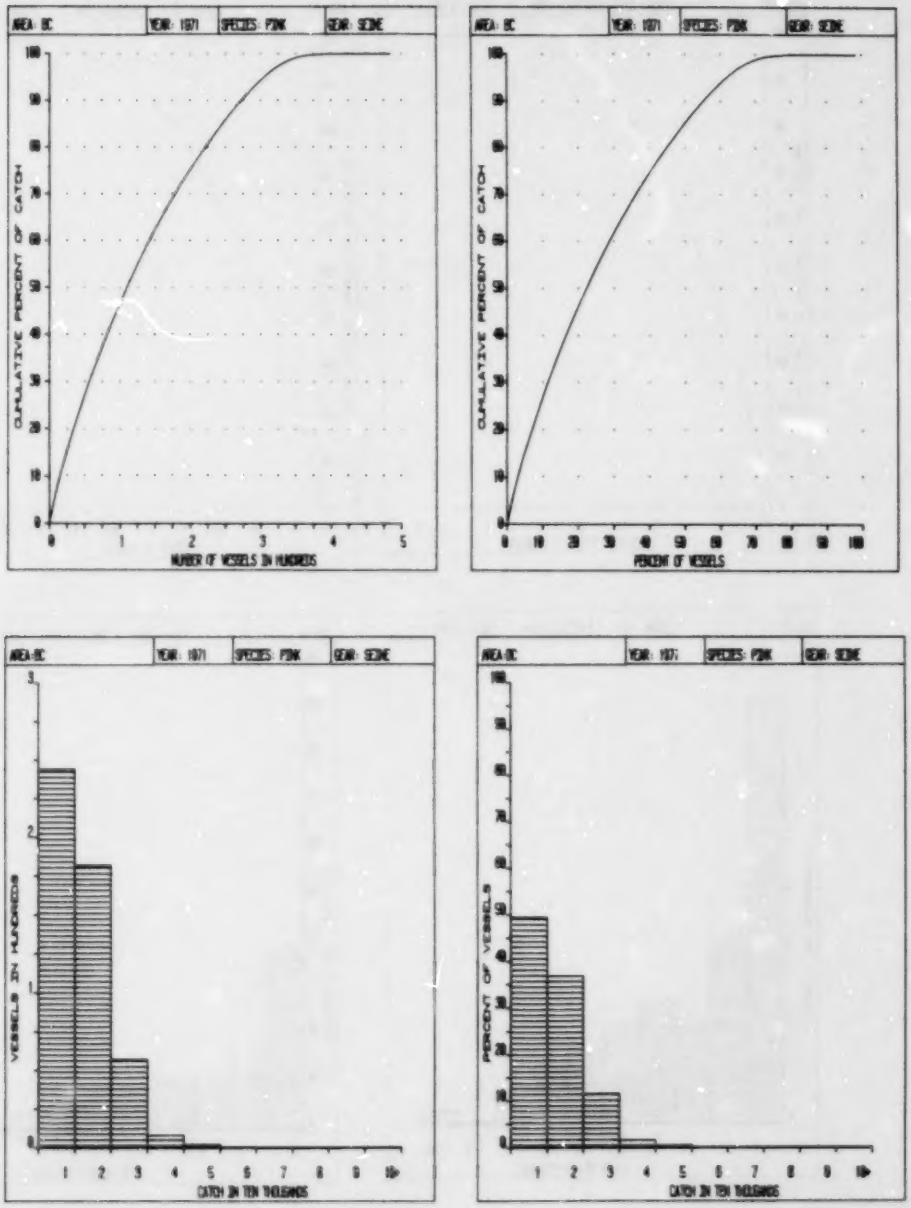

Fig. 85. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1971.

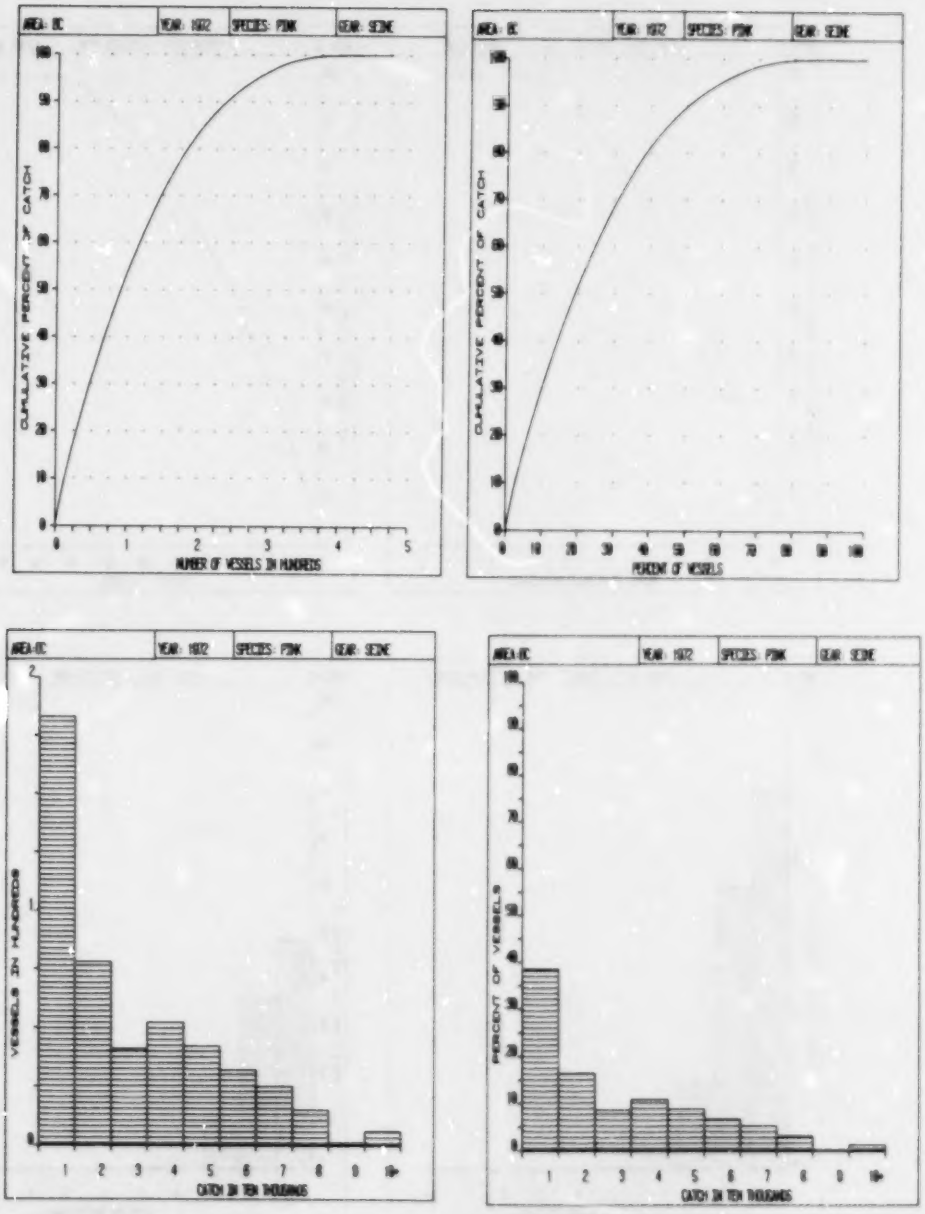

Fig. 86. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1972.

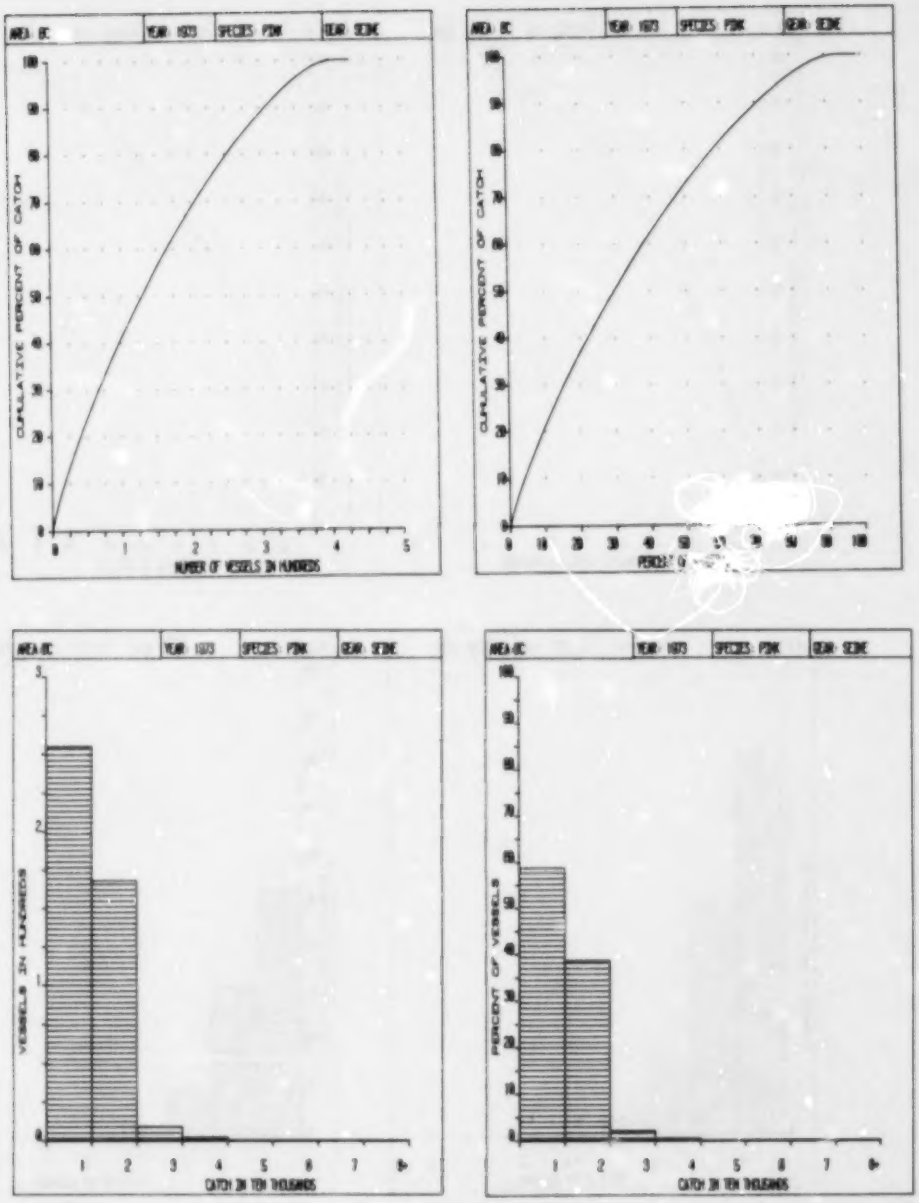

Fig. 87. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1973.

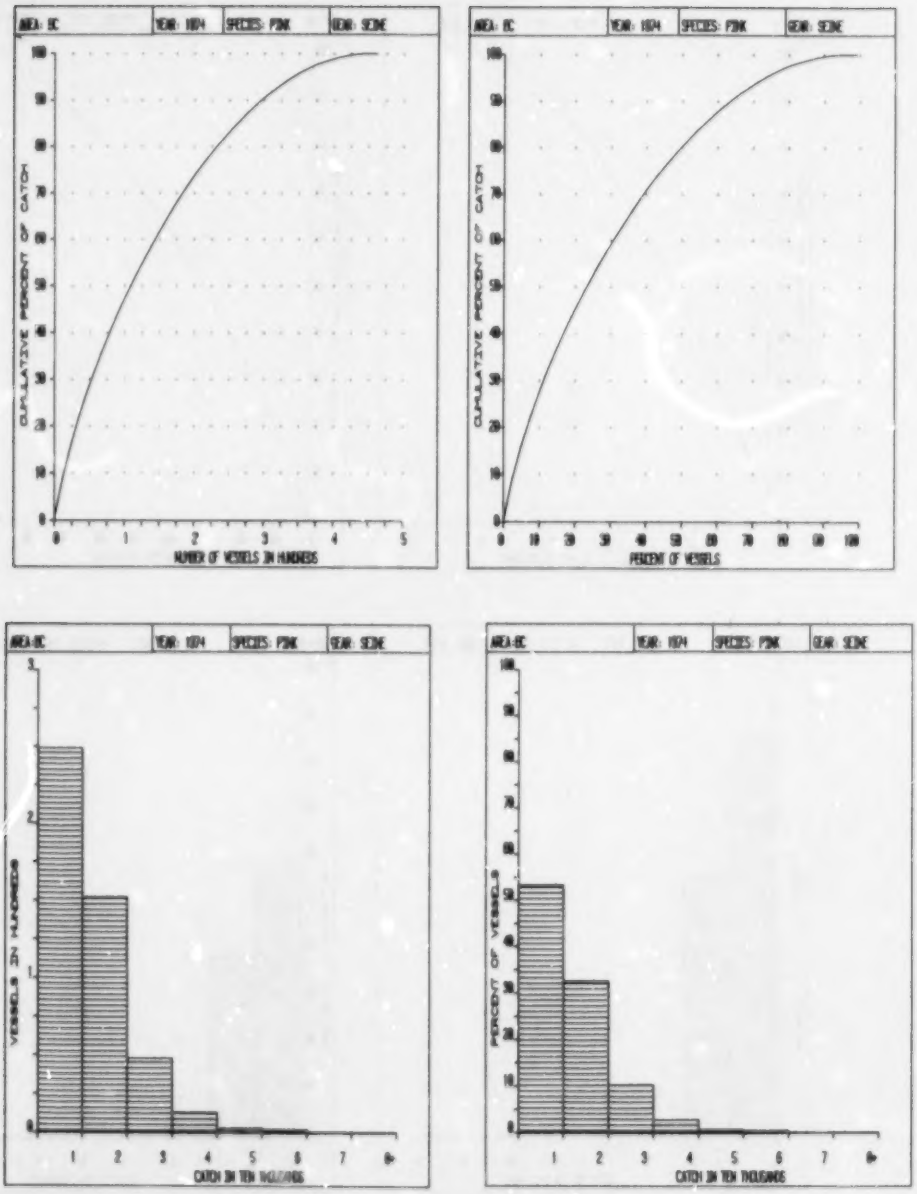

Fig. 88. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fisnery, 1974.

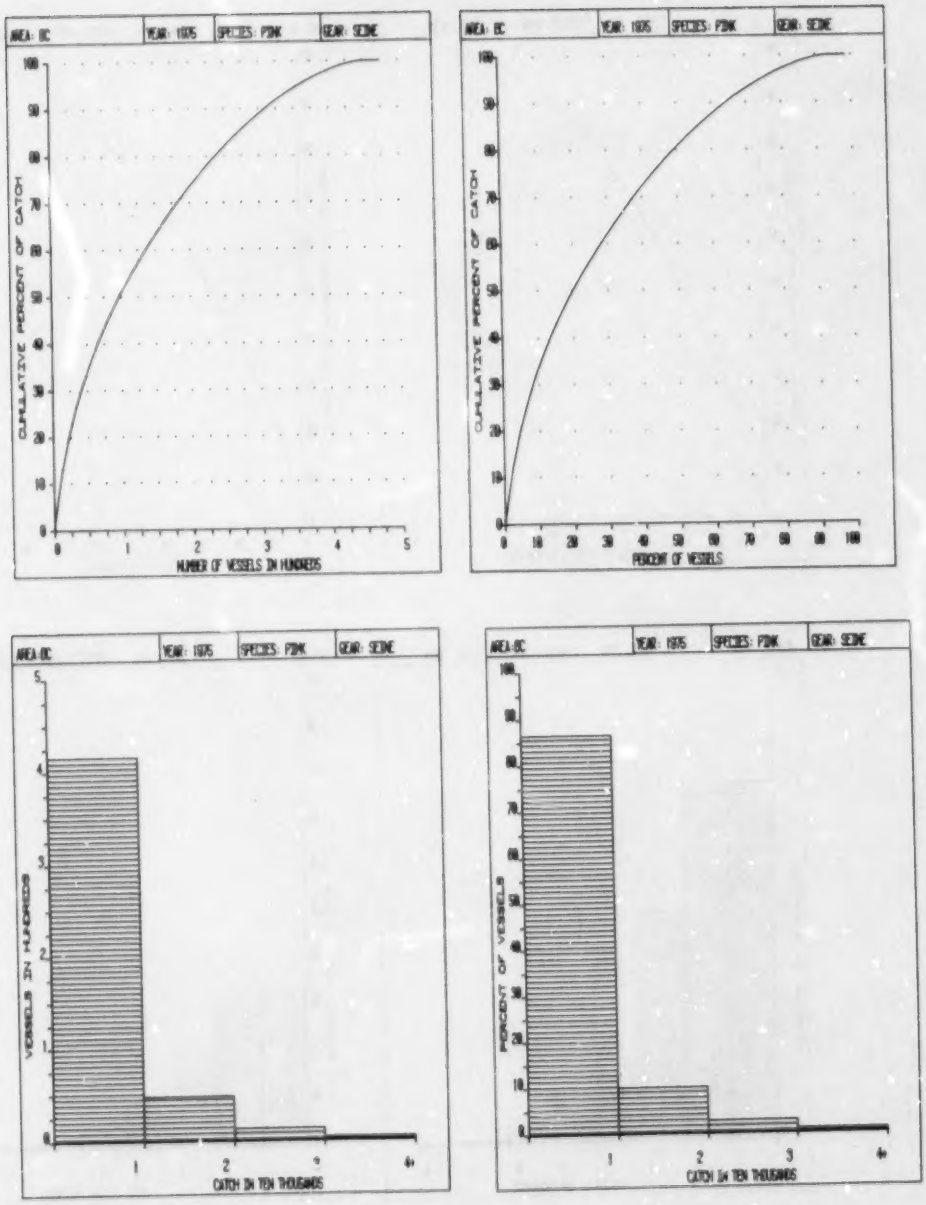

Fig. 89. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1975.

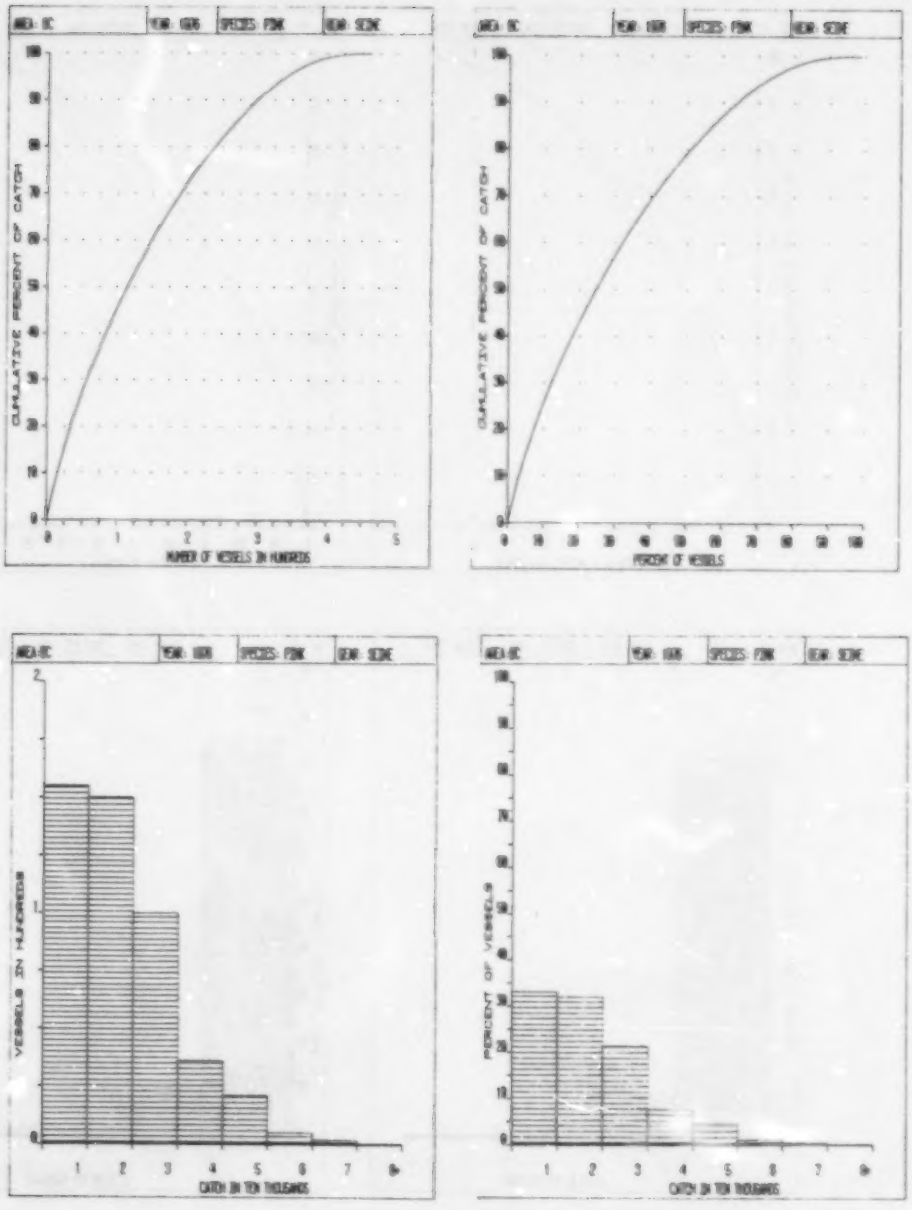

Fig. 810. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1976.

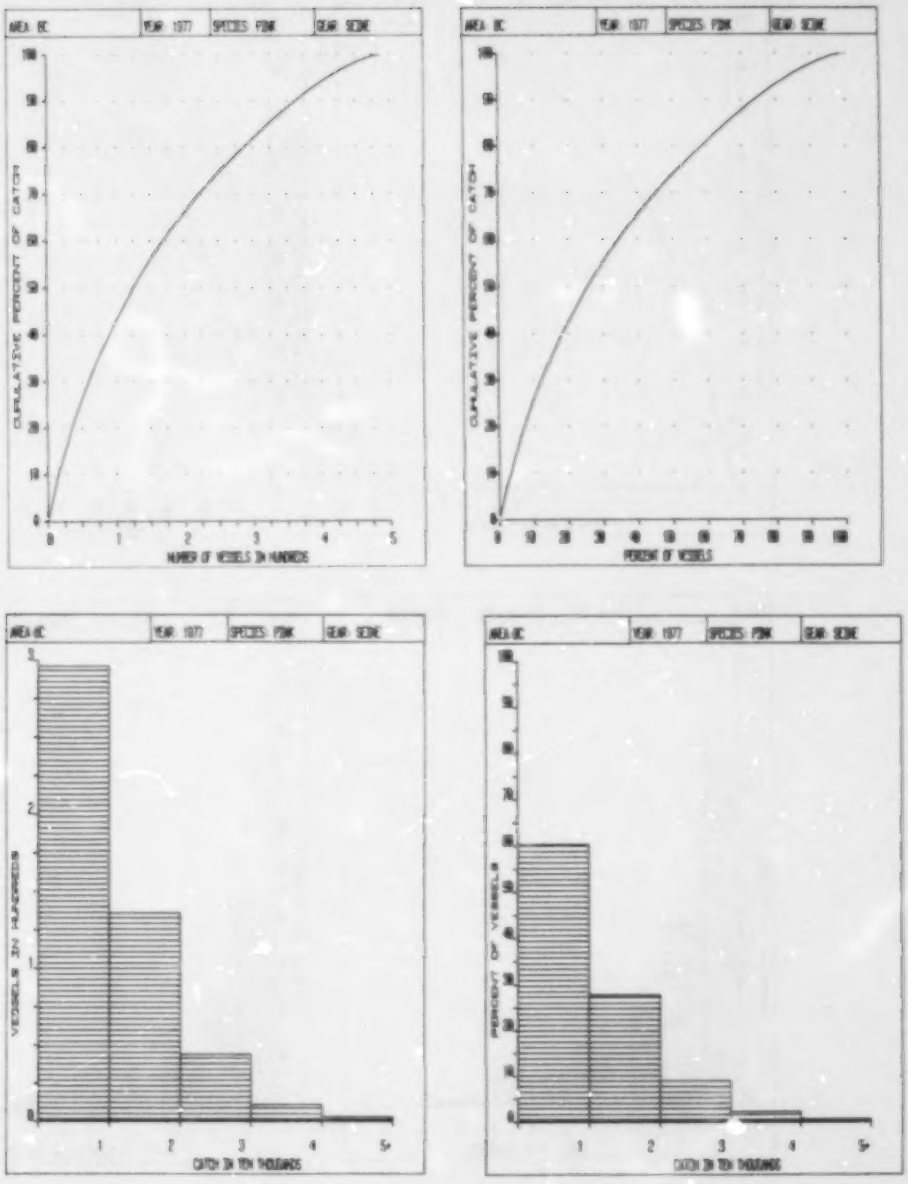

Fig. 811. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1977.

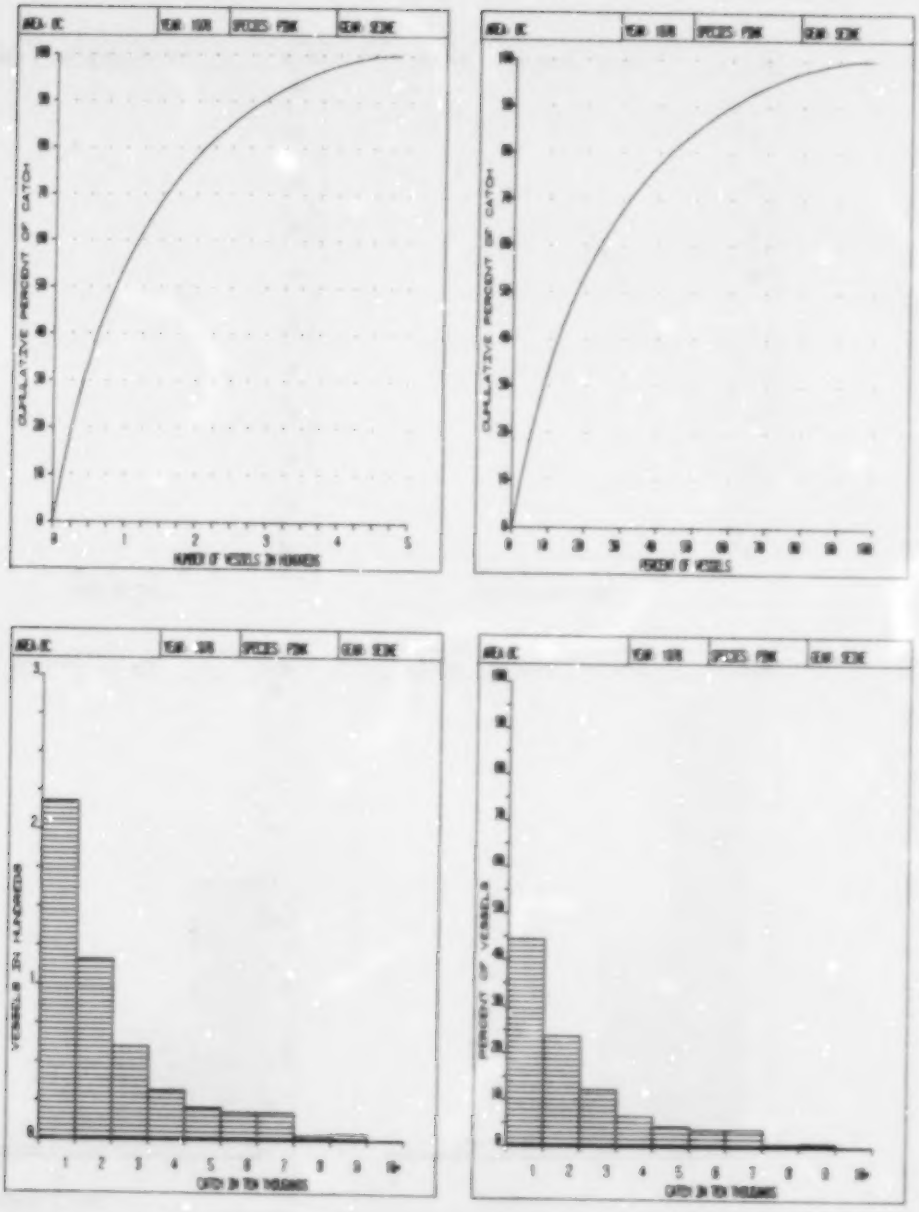

Fig. 812. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1978.

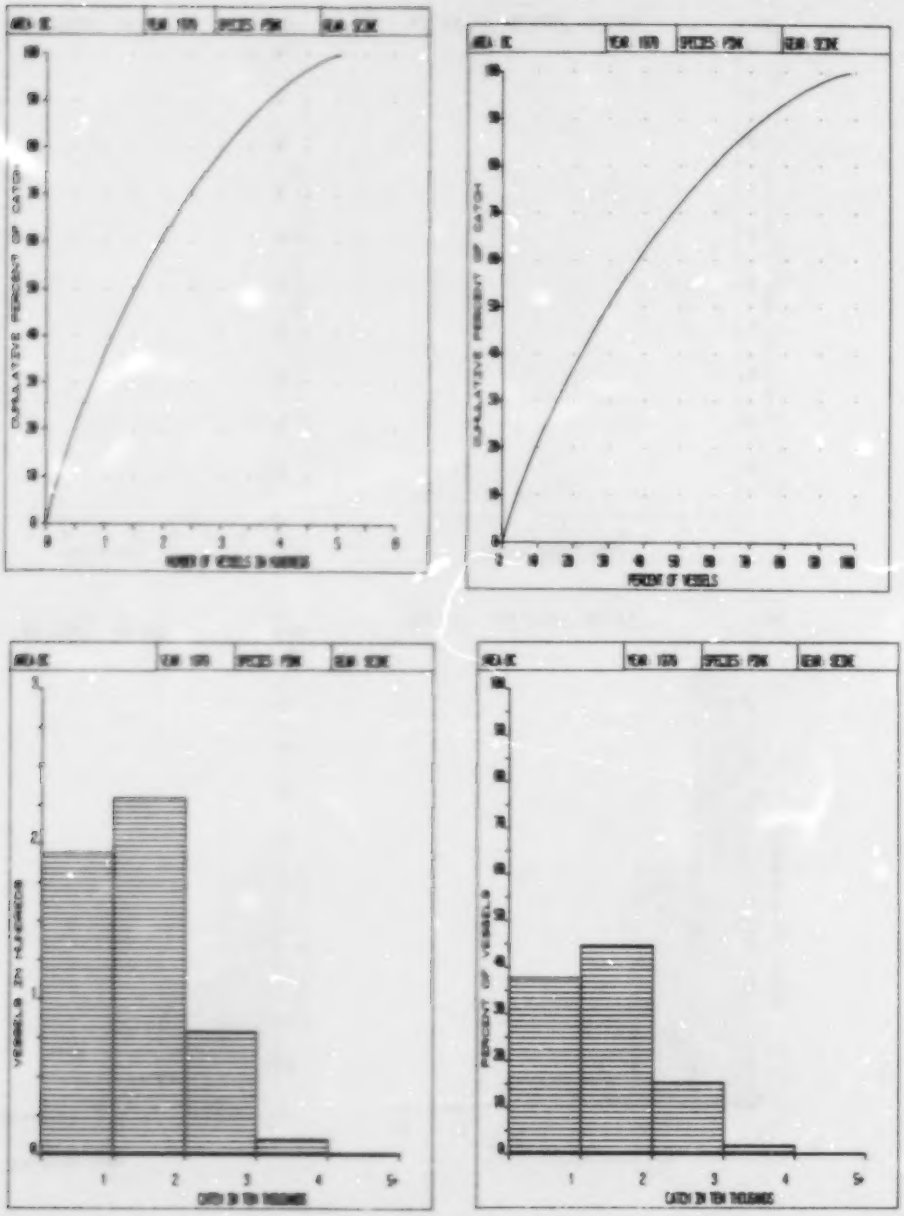

Fig. 813. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1979.

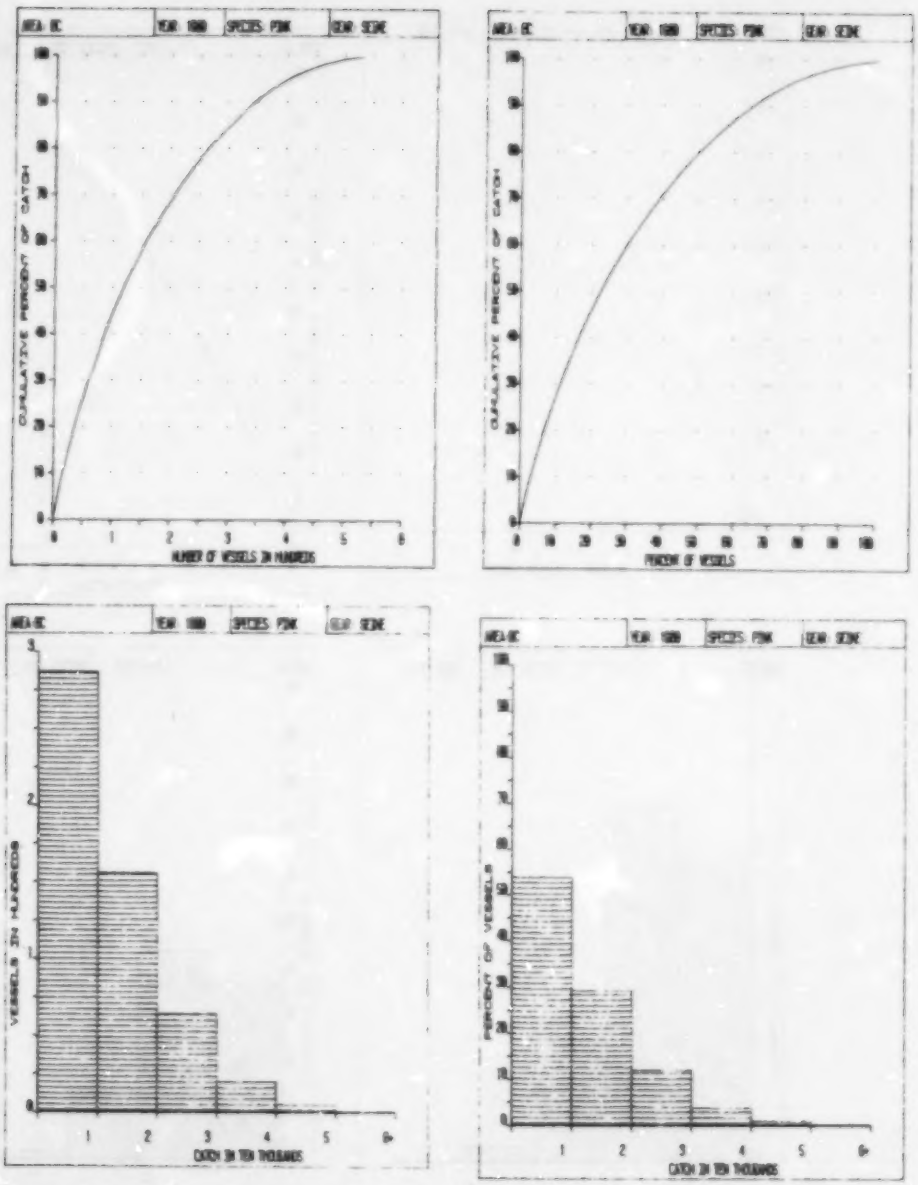

Fig. 814. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1980.

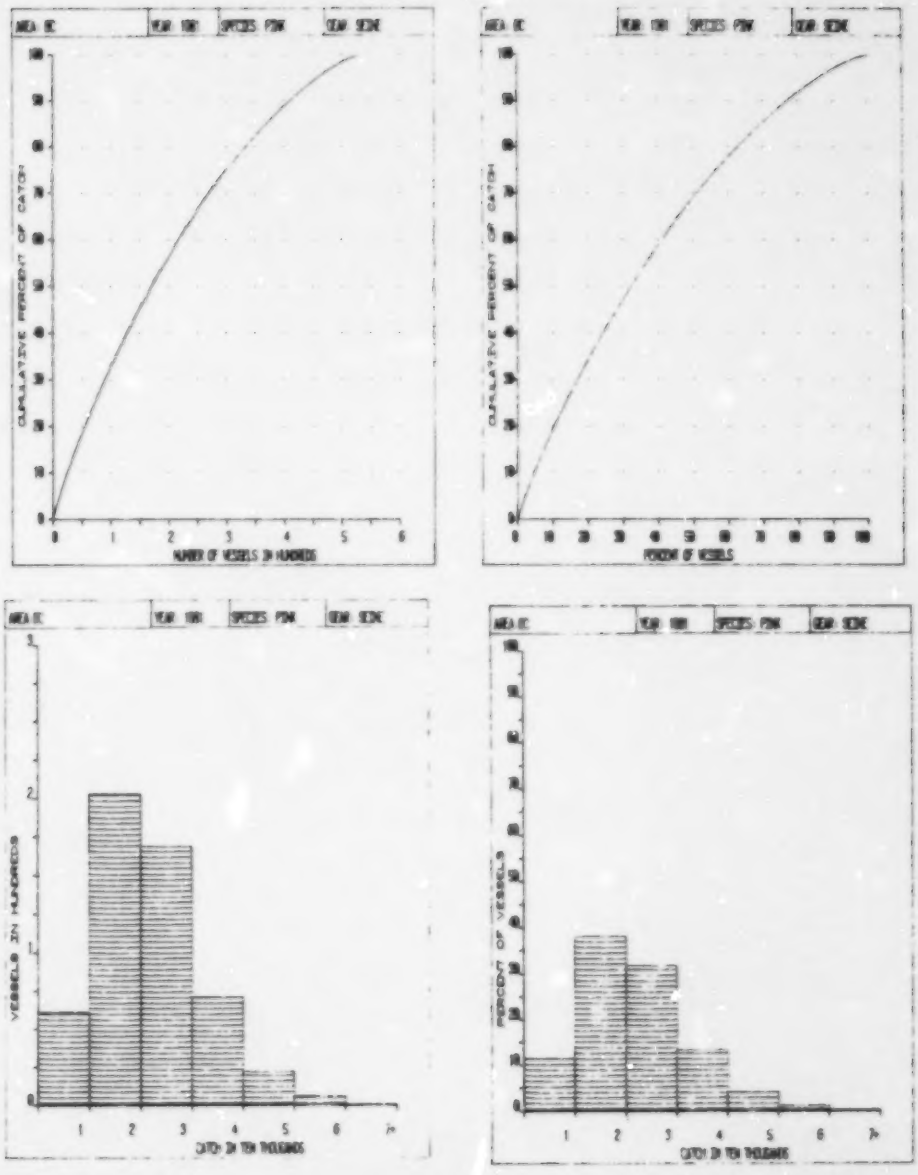

Fig. 815. Cumulative percent and frequency of catch of pink salmon versus number and percent of purse seiners that participated in the fishery, 1981.

Appendix C.

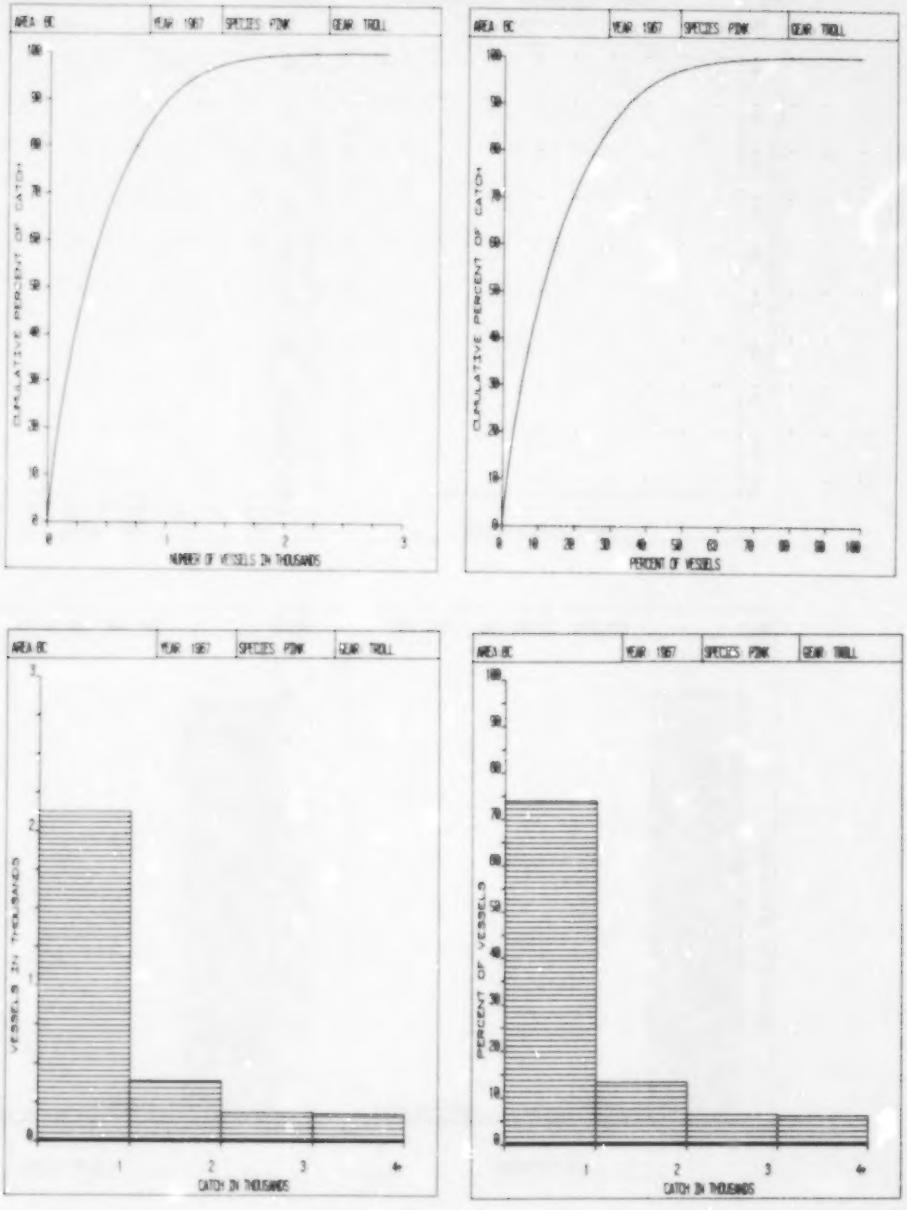

Fig. C1. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1967.

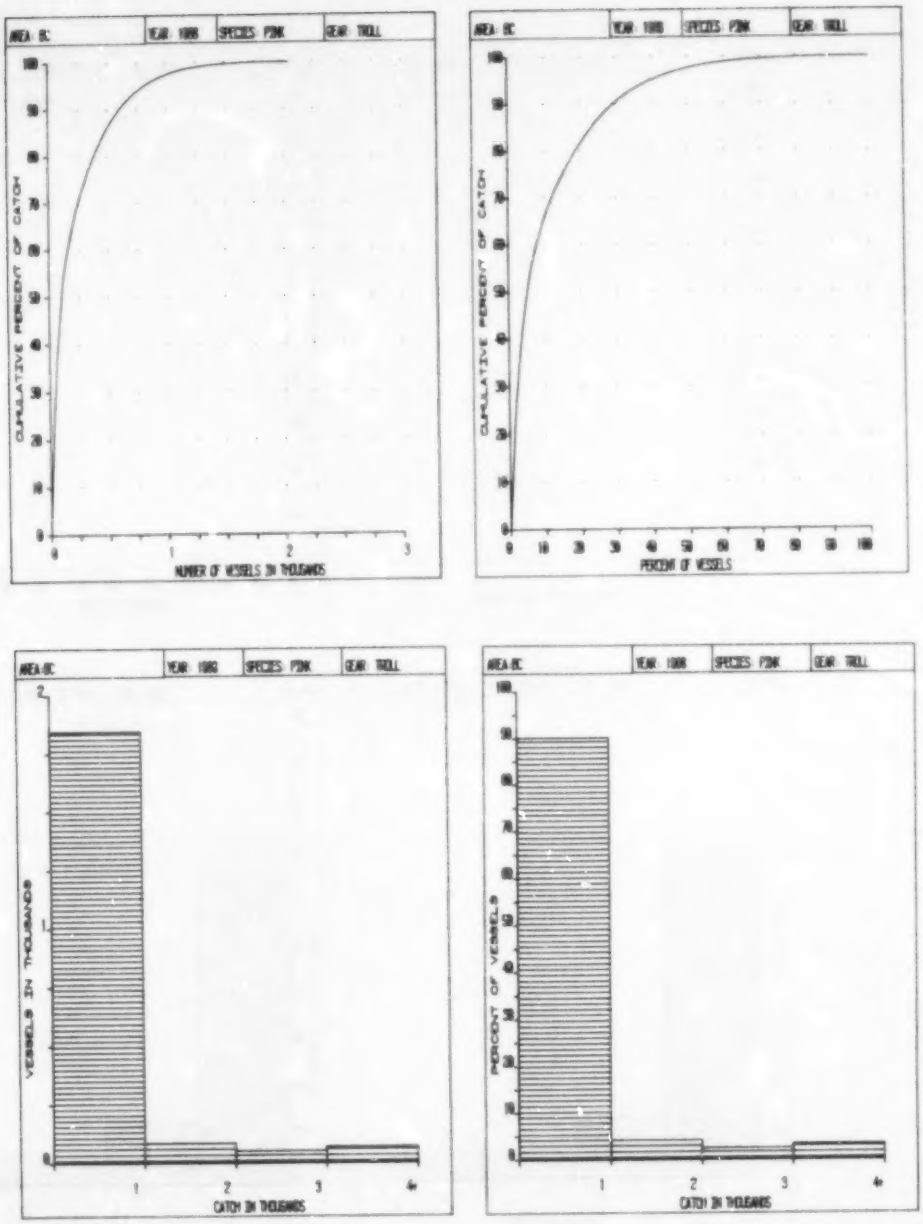

Fig. C2. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1968.

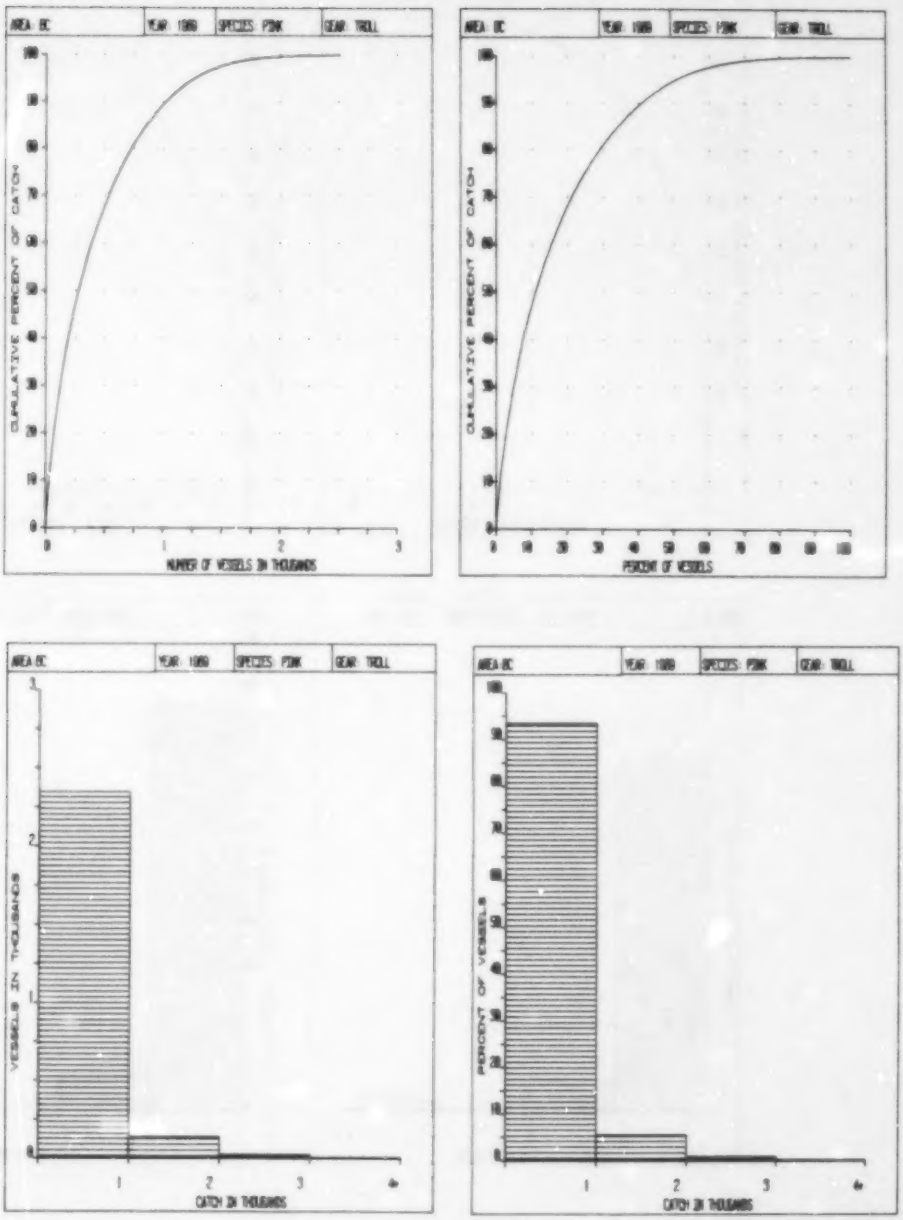

Fig. C3. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1969.

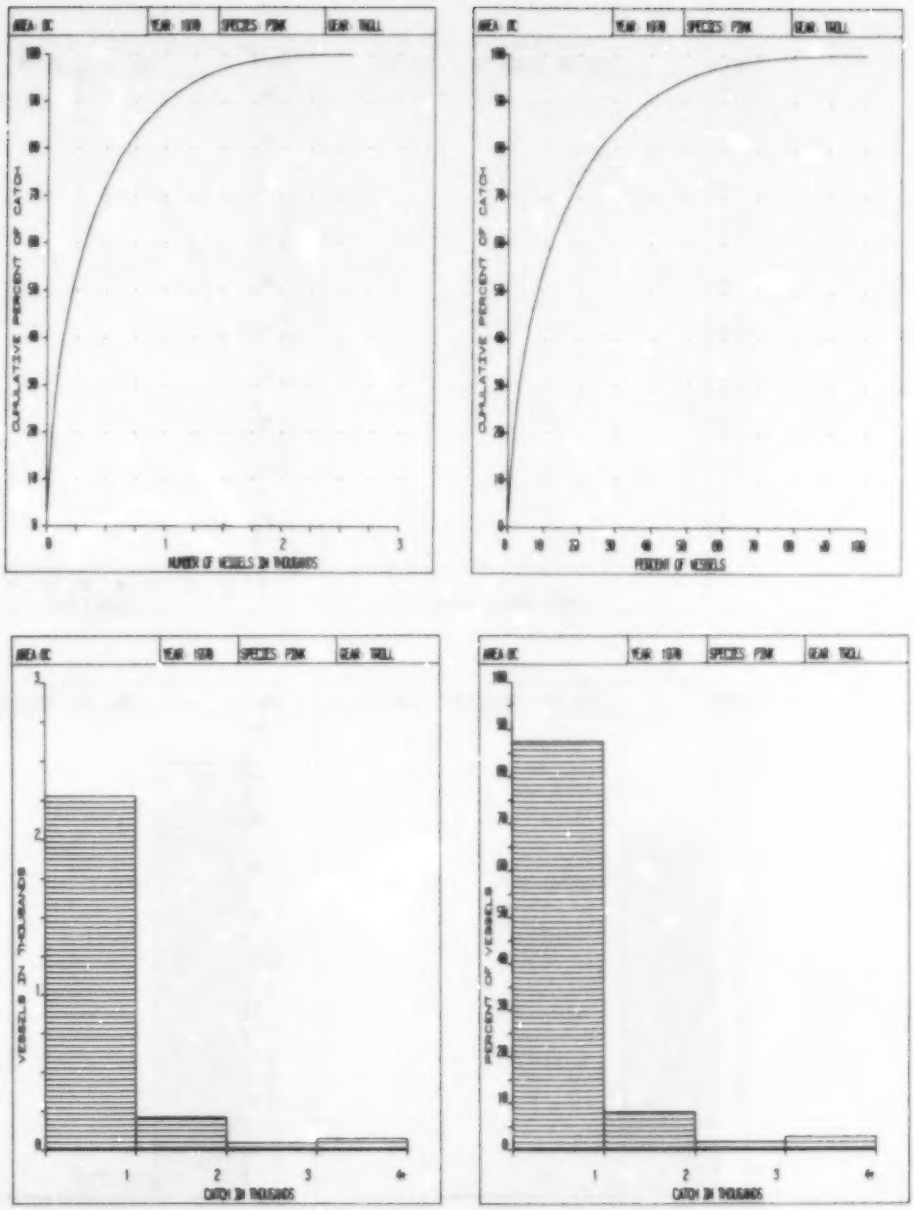

Fig. C4. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll year and participated in the fishery, 1970.

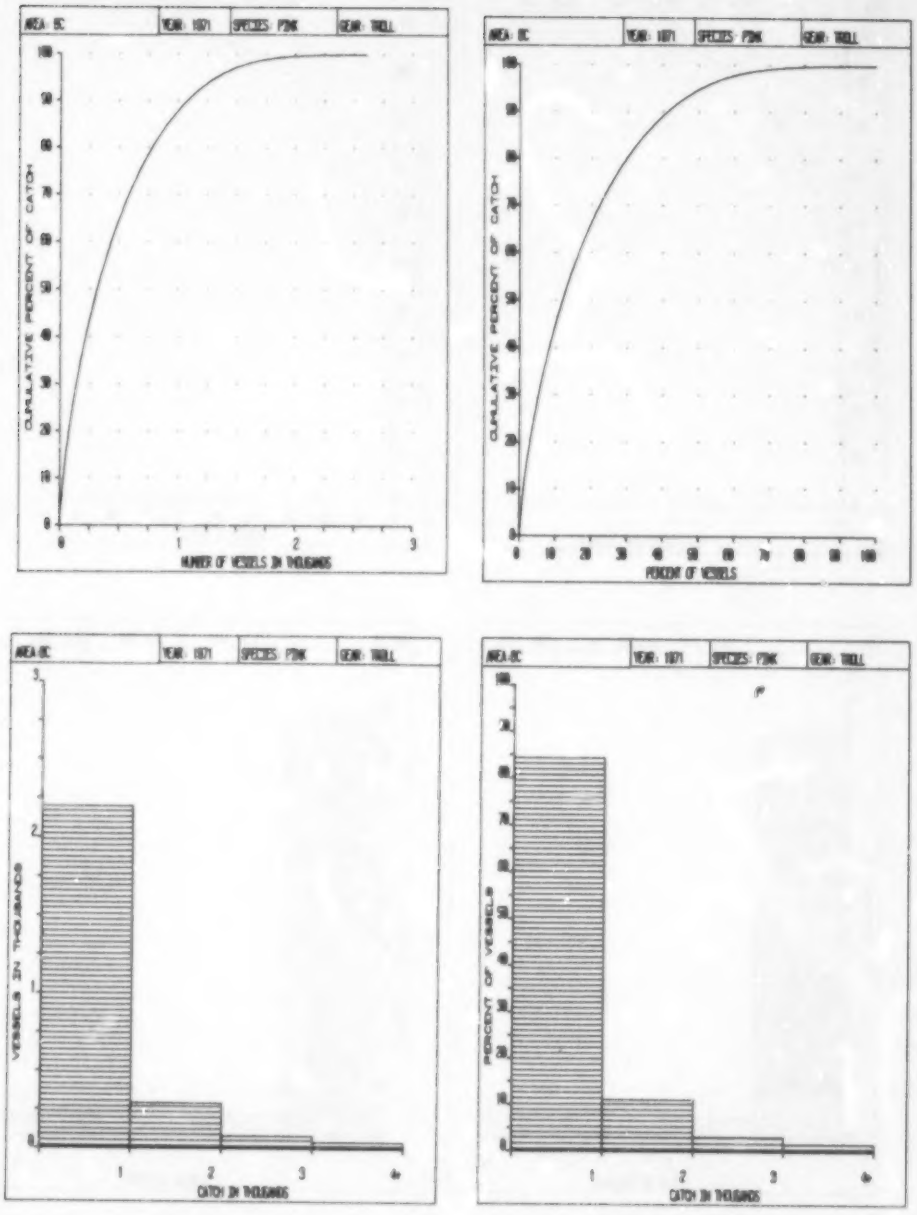

Fig. C5. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1971.

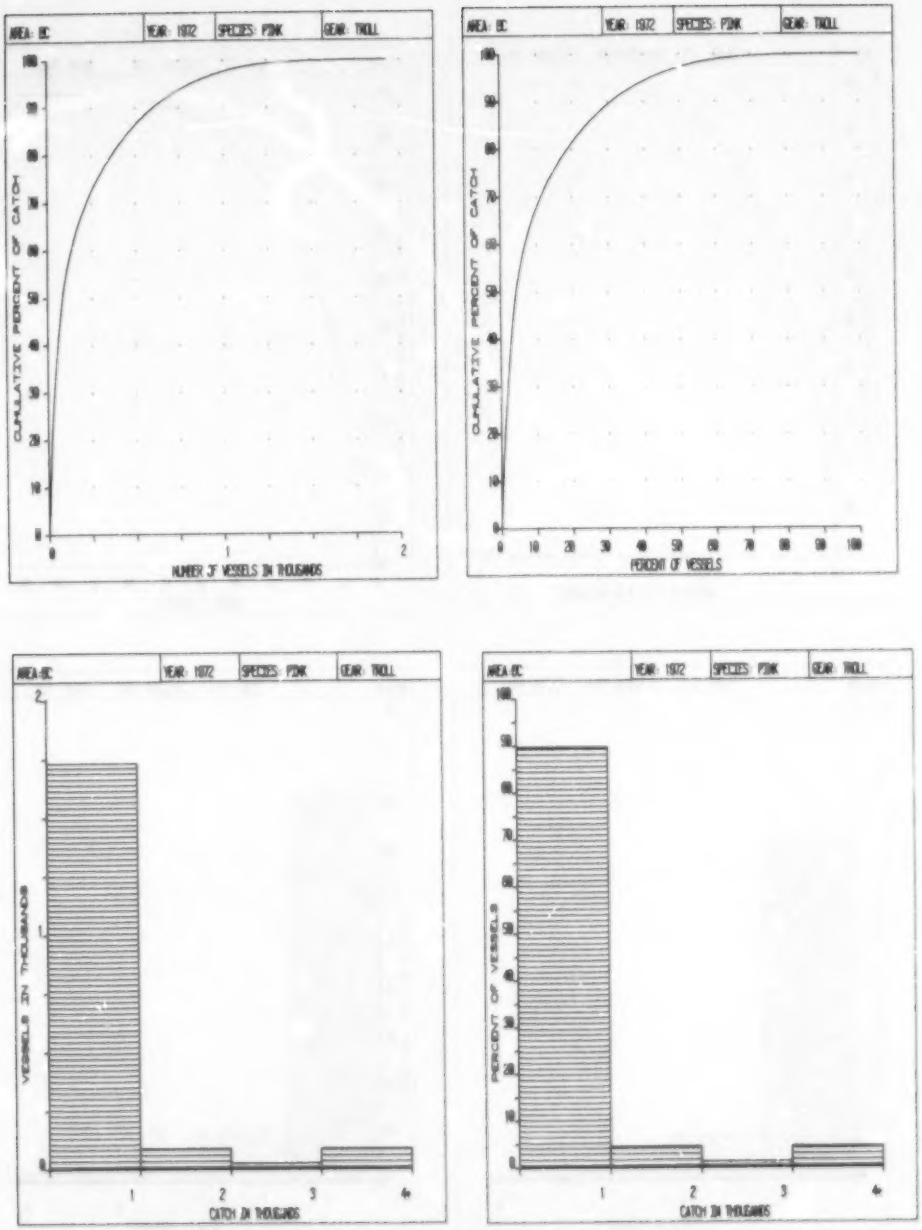

Fig. C6. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1972.

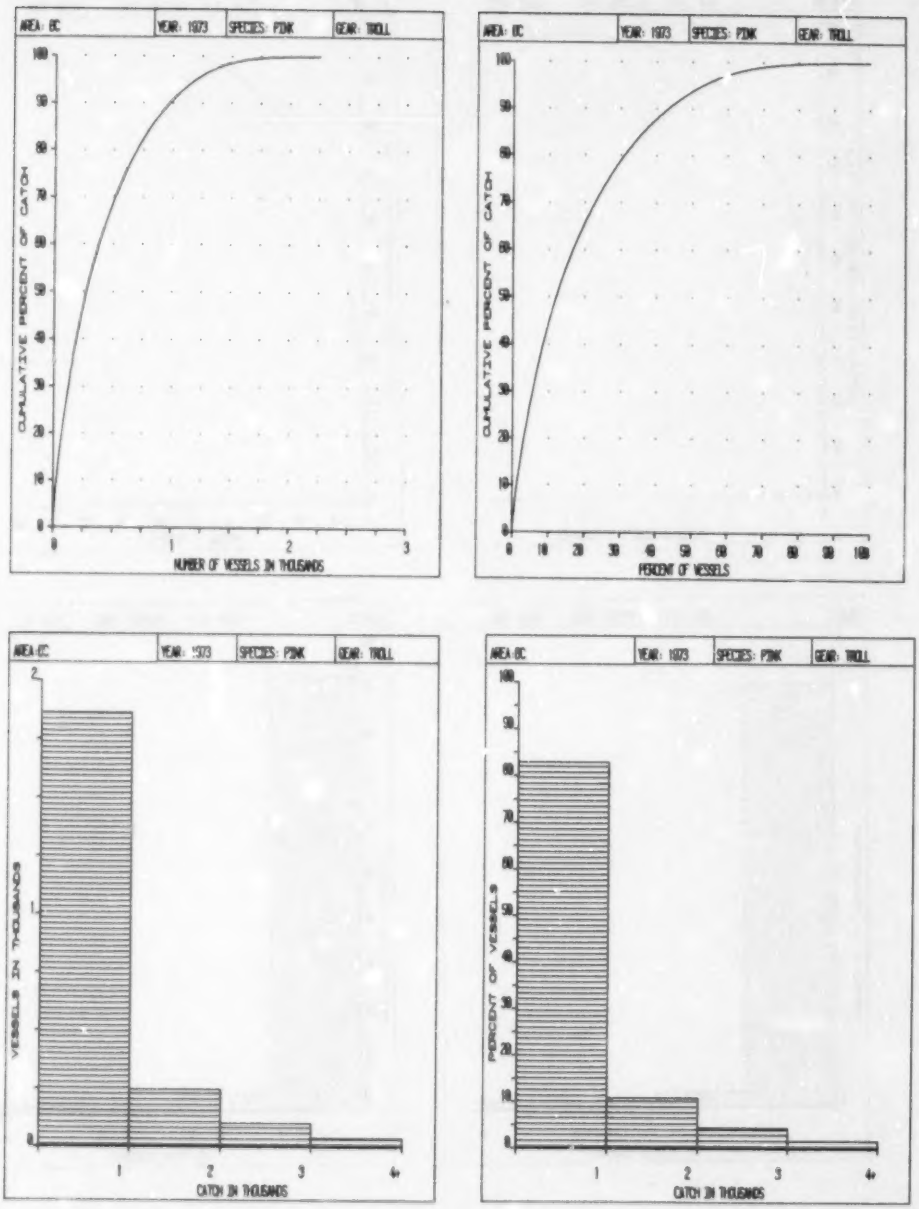

Fig. C7. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1973.

Fig. C8. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1974.

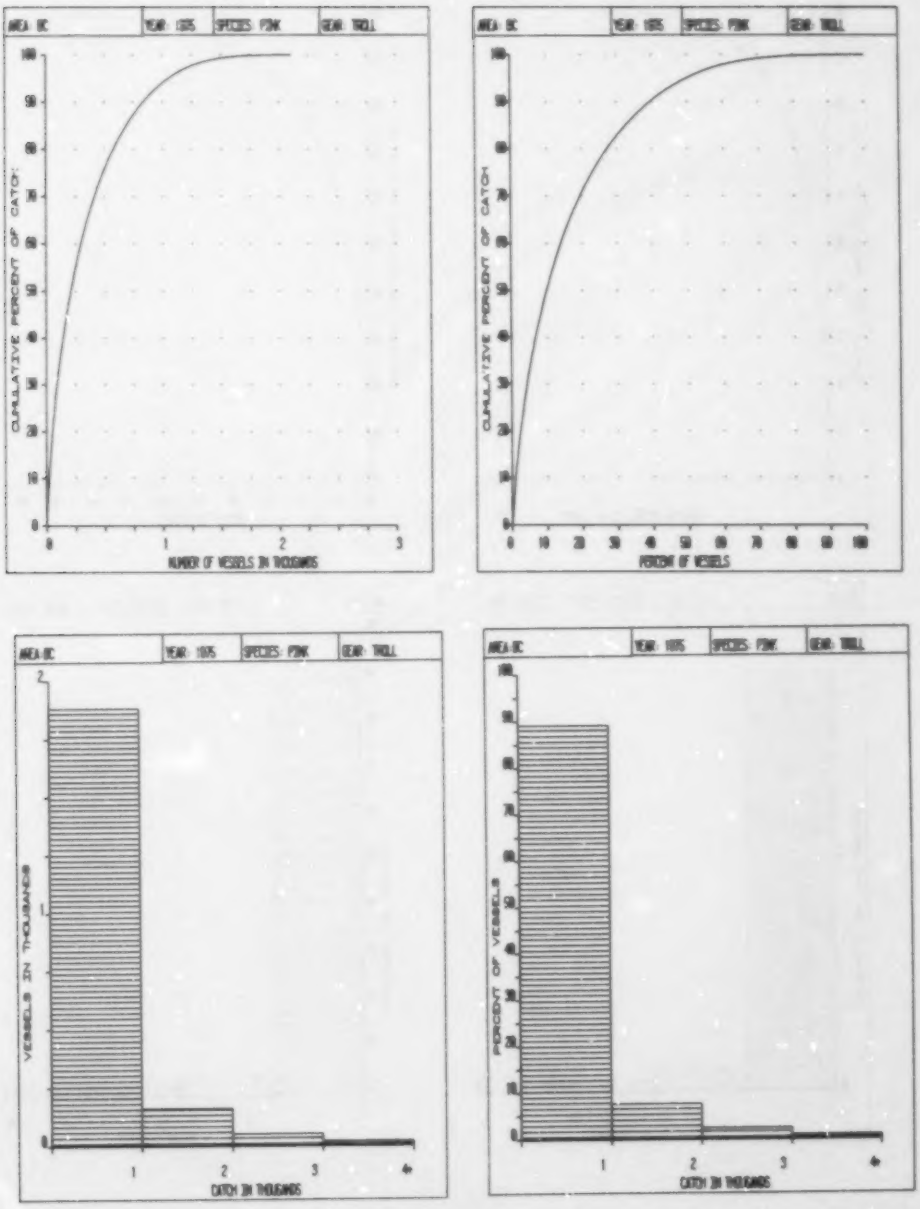

Fig. C9. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll year and participated in the fishery, 1975.

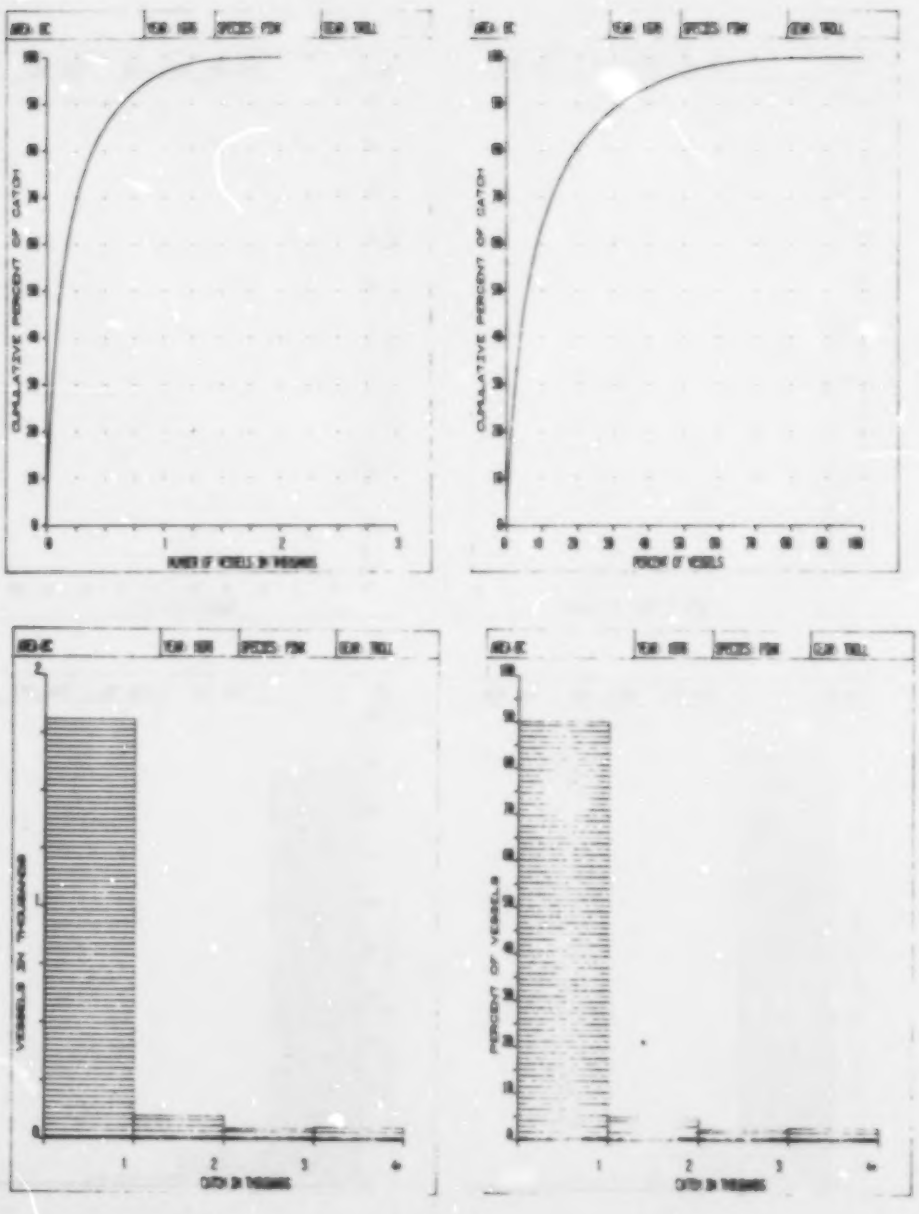

Fig. C10. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1976.

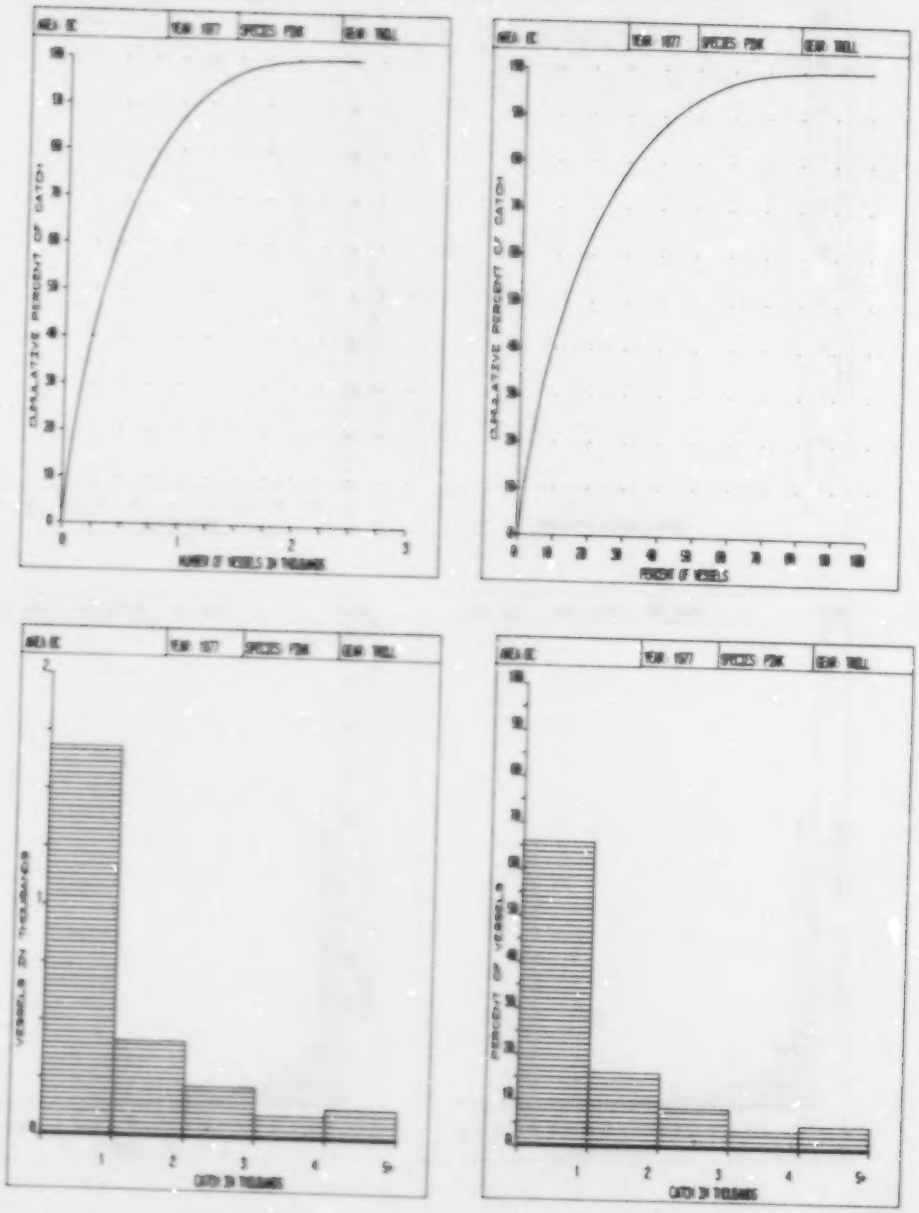

Fig. C11. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1977.

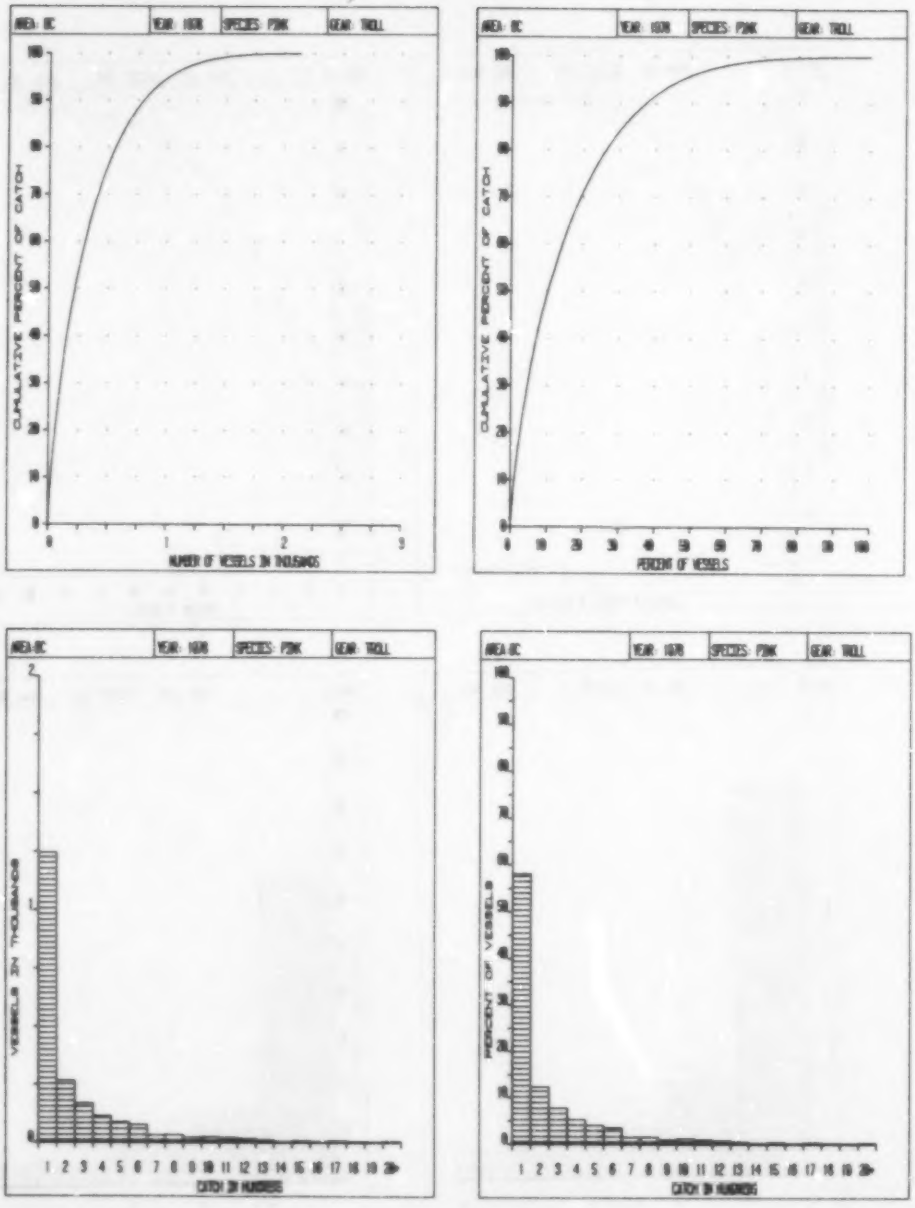

Fig. C12. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1978.

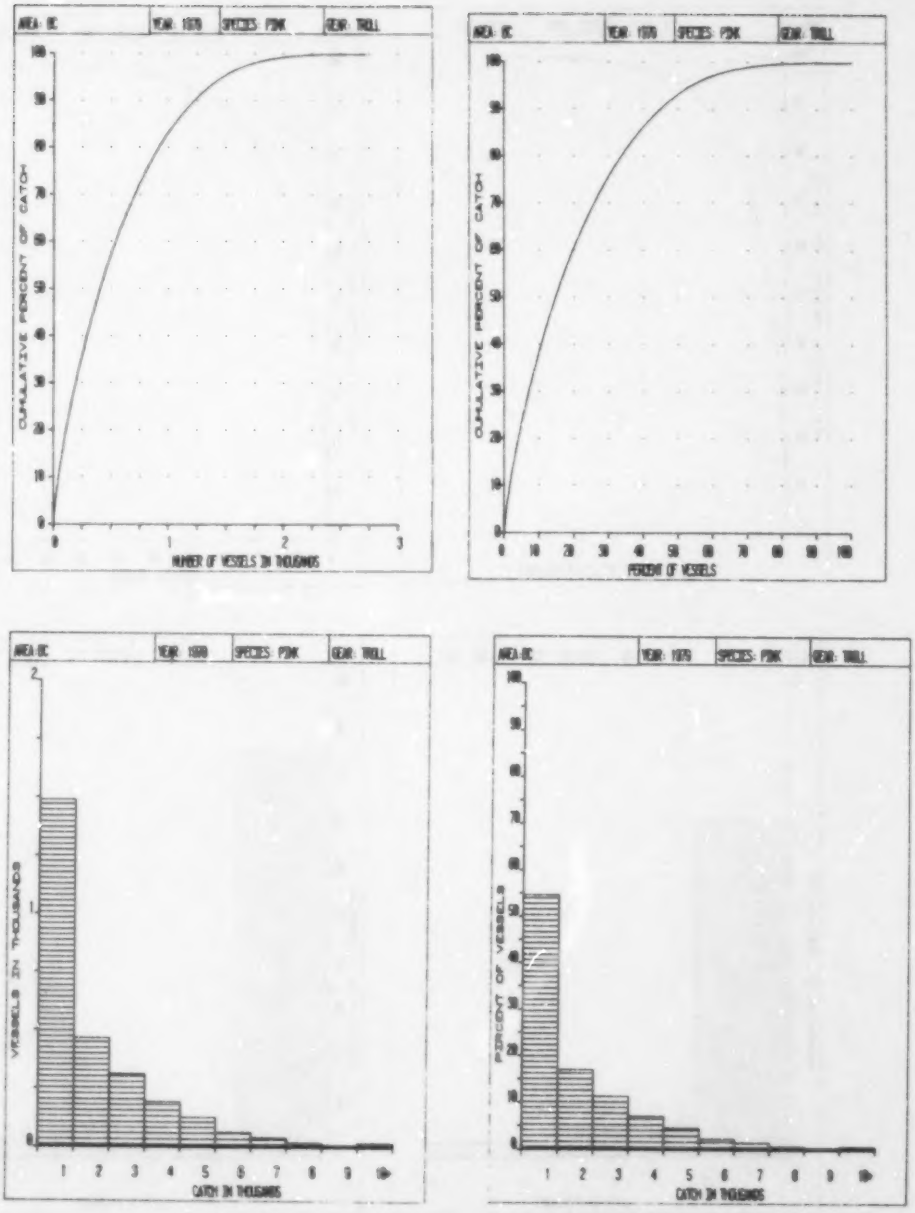

Fig. C13. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1979.

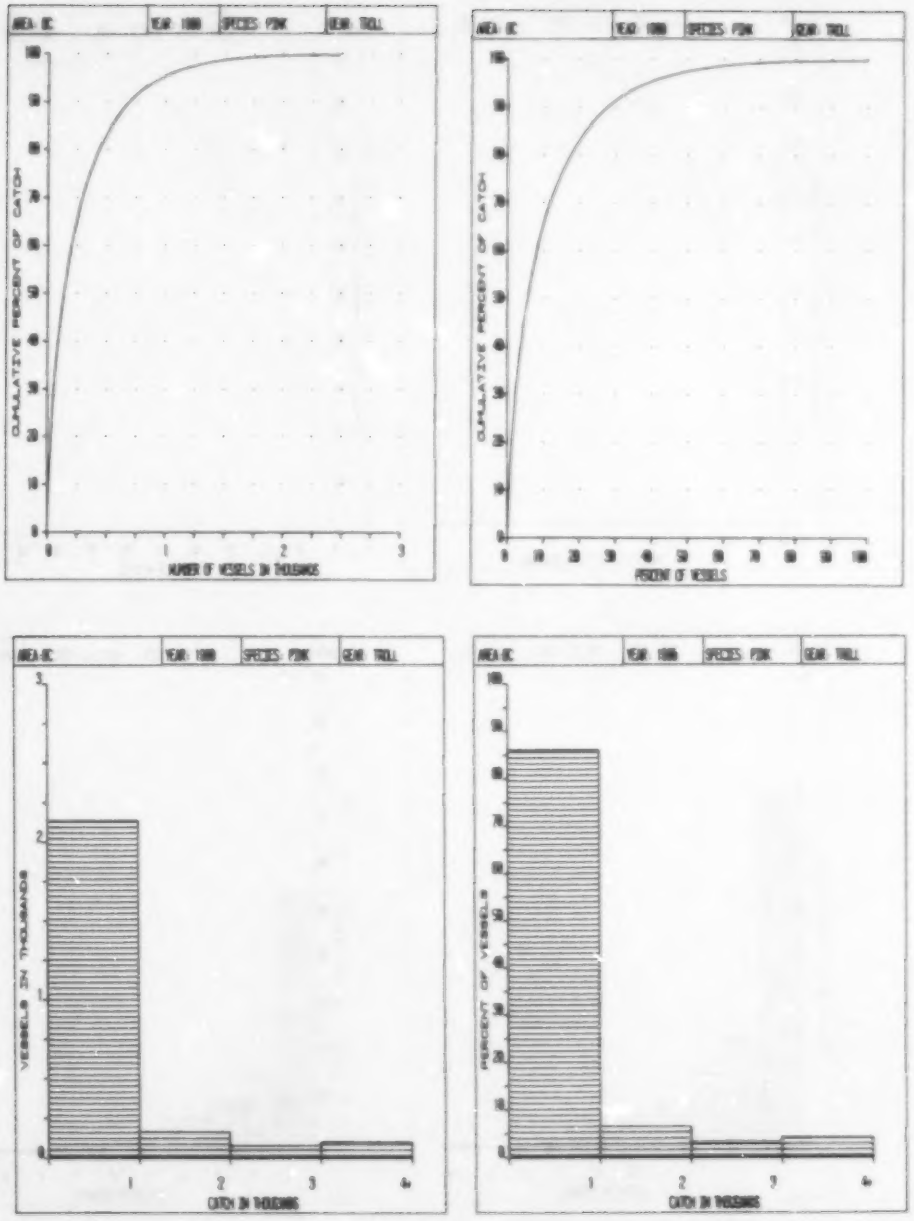

Fig. C14. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in the fishery, 1980.

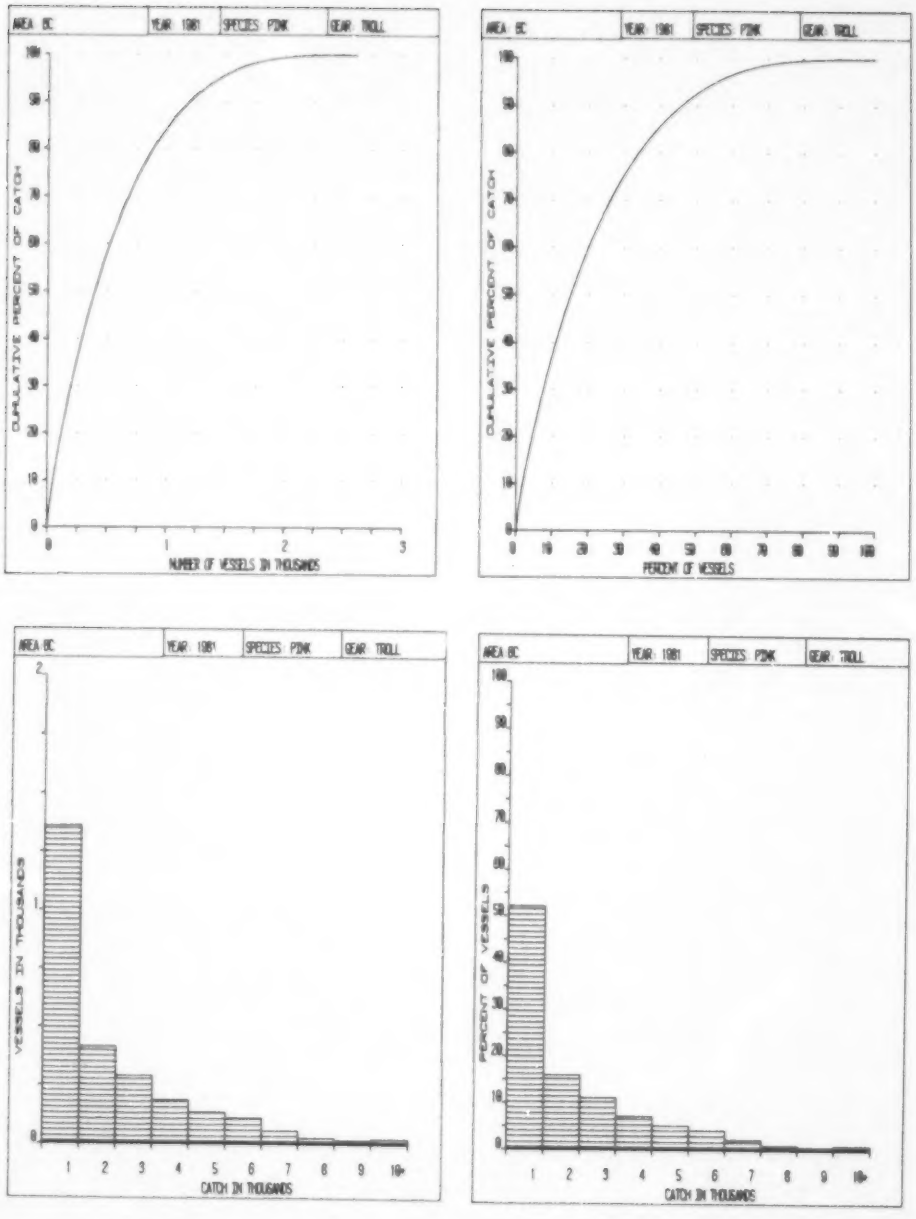

Fig. C15. Cumulative percent and frequency of catch of pink salmon versus number and percent of vessels that used troll gear and participated in tne fishery, 1981.